This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

Industrial Medicine

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Respiratory Hazards of Electric Arc Welding

—An Appraisal of Known and Potential Effects of Welding Fumes as Systemic Reactions and as Local Irritants of the Respiratory Tract; Review of Literature and Personal Observations—

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IN THE twenty-odd years that electric arc welding has been in existence as a trade, it has been regarded as a relatively safe procedure as far as harmful effects on the lungs and upper respiratory tract are concerned.* The literature on welding as a respiratory hazard is notable by its lack of case reports, except for the few cited in this review. All of these have one thing in common; namely, exposures to unusually heavy concentrations of welding fumes resulting from unusually confined work. It is the purpose of this paper to discuss the reactions brought about by these unusual situations and to point out other possible hazards which may result from the newer types of welding.[1]

The breathing of excessive concentrations of electric welding fumes may result in general body reactions (or poisonings) or in local reactions within the respiratory tract itself. While the general poisonings are not respiratory diseases, they are included here because the toxic substances are inhaled through the respiratory tract.

METAL FUME FEVERS. Among the general reactions, those that come to mind first are the "brass chills or shakes" because they are the most common as well as the most dramatic. They may come on several hours after intense exposure to fumes containing zinc oxide and are accompanied by fever up to 102°F. The chills may last for several hours, ending in profuse sweating and some exhaustion. In most cases, however, no symptoms remain the following morning and work usually is resumed. Although the chill is unpleasant and briefly disabling, it does not cause tissue damage.

Drinker, Thomson, and Finn[2] found that concentrations of 14 mgms. of zinc per cubic meter for eight-hour exposures or 45 mgms. for short exposures could be tolerated by the average worker without causing the "shakes." Workers vary greatly in their susceptibility, however, and some may remain unaffected with much higher concentrations. A relative immunity seems to be established in some cases, many older brass workers having had only one attack early in their working lives and never another. It is possible that they were more careful after the first attack to avoid the intense exposures.

Any metal being welded or electrode being used which contains considerable amounts of zinc, such as galvanized iron, brass and bronze, must be classed as a potential fever producer. Magnesium and copper oxides in finely divided state also are known to cause the fever. Theoretically iron and aluminum oxides should do the same, but Drinker[3] seems to have demonstrated with his laboratory animals that they do not produce this reaction. This is quite fortunate, because iron oxide in extremely finely divided state (particles less than ½ micron in diameter) is the chief component of the fumes in all steel and iron welding. It should be added that none of the metal oxides which cause fever reactions have a cumulative effect, all being promptly eliminated.

LEAD POISONING. With inhalation of lead particles, however, the effect is definitely cumulative, making lead poisoning by far the most important of the metal poisonings. Practically all forms of lead are toxic because of their ready solubility in the tissues, and inhaled lead dust is far more toxic than that which may be taken into the intestinal tract. The earliest reports of the health hazards of welding were cases of lead poisoning arising among gas welders engaged in the scrapping of

* Subject matter of a presentation at a symposium on welding at School of Mechanical Engineering, University of Wisconsin, Madison, April 29, 1937, now brought up to date.

naval vessels, the lead paint being volatilized into extremely fine particles by the cutting flame.[4] Since then cases also have been reported when the electric arc was used. In fact, any material being welded which contains lead or is coated with lead paint creates a lead hazard. It, therefore, becomes necessary to ascertain as far as possible the composition of the material to be welded before the operation begins, so that special precautions may be taken when it contains appreciable amounts of a known toxic material. Regarding safe limits of lead dust, it is probable that from one to two milligrams per 10 cubic meters of air breathed is fairly safe.[5]

Where the lead hazard is known and difficult to control, constant medical supervision of those exposed is advisable. Only by laboratory studies of the blood at regular intervals can the earliest signs of lead absorption be detected long before symptoms of intoxication develop. With such supervision and with engineering methods to prevent excessive inhalation of the lead dust, cases of lead poisoning need not develop.

MANGANESE, SELENIUM, ARSENIC, AND CADMIUM POISONING are mentioned only as possibilities for the future, as newer types of metal alloys are being developed daily containing these elements and as they will doubtless be incorporated in the welding rods used with these newer metals. As a matter of fact, two cases of manganese poisoning already have been reported from Germany,[6] in which the electrode used contained .2% manganese. All of these elements are toxic in sufficient dosage and it seems advisable that manufacturers of welding rods become acquainted with the physiologic properties of these rarer elements before they incorporate them in their rods.*

CARBON MONOXIDE POISONING is mentioned also as a theoretical possibility with electric welding, because this gas is generated when a hot flame impinges on cold metal. The quantities produced are so minute, however, as to be negligible even for confined work with the electric arc. With gas welding, on the other hand, the hazard is a real one and requires constant vigilance.

When welding is done in very confined spaces, the small supply of oxygen available for breathing may be consumed so rapidly by the arc that *suffocation* may result. Although no cases have been reported with arc welding, welders should be warned not to work in such small spaces even for short intervals without a constant supply of fresh air.

LOCAL REACTIONS IN THE RESPIRATORY TRACT. Local reactions described first were the acute changes, a death, by pulmonary edema having been reported in Germany by Adler-Herzmark in 1929.[7] This intense reaction was attributed to the nitrous gases. Another fatal case of pulmonary edema was reported by a Washington physician, Frank Williman, in 1935. In both cases, welding with the electric arc had been done in very confined and unventilated spaces.*

The first experimental animal work with welding fumes was done at the Harvard School of Public Health under Phillip Drinker.[3] They exposed rabbits and cats to fumes from which had been filtered the iron oxide particles and found that death resulted in some of the animals. The common finding in all the animals was intense inflammation and hemorrhage of the mucous membrane of the respiratory tract, which resulted in fatal edema in the animals that died. They were able to prove, therefore, that it was the gases and not the particulate matter which caused the intense local reaction. It must be stated that the animals that died had been exposed to concentrations of fume that were more than three times as great as those ordinarily encountered around a welder in a poorly ventilated shop. The conclusion to be drawn from this experimental work, therefore, is that welding fume gases cause local respiratory reactions only when intense concentrations are inhaled.

The gases thus far described as occurring in welding fumes are nitrogen peroxide, a trace of ozone, and a little hydrogen peroxide. These were first studied by Keiser and McMaster[8] in 1908 as the gases produced when air was acted upon by electric sparks, the flaming arc, or other means producing high temperatures. Two Russians, Druskin and Krassinskaja,[9] have since stated that ozone was the irritant gas, the nitrogen oxides being present only in amounts below permissible concentrations. As has been stated, Drinker formed no conclusion as to what the gases might be. Accurate gas analyses of the various types of welding fumes are urgently needed in order to determine safe limits of their concentration. Until these are made and have been checked by numerous investigators, the only rule which can be laid down is that welding should not be done in unventilated spaces without respiratory protection. If this rule is followed, there should be no acute cases of pulmonary edema and pneumonia.

A varying amount of calcium fluoride often is present in the rod coatings used with stainless steel and with aluminum welding. This comes off in the fumes as silicon tetra fluoride, which is known to have a caustic effect on mucous membranes when in sufficient concentration. Although no case reports of severe reactions in welders have appeared in the literature, questioning of welders reveals that this type of welding always is more irritating to the throat and bronchial tubes even when the fumes are not particularly heavy. The United States Navy has discouraged the use of electrodes containing fluorides, but it appears that more satisfactory welds are possible with stainless steel and aluminum when a certain amount of fluoride is present. Until a satisfactory substitute is developed, special precautions will be necessary with electrodes containing this caustic material.

CHRONIC CHANGES IN THE LUNGS. That welding fumes can cause chronic lung changes over a prolonged period of time is a still newer phase of the problem. Somewhat over three years ago a certain Milwaukee industrialist, who has always been

* See reference No. 13 in Bibliography for another case report of fatal exposure to fumes in a closed tank.

on the alert regarding possible health hazards of new industrial processes, asked the author whether the new flux-coated rods might cause silicosis. He had seen a report of the composition of one of these rods and had noted that it contained a certain percentage of silicate. The literature was searched for published material on the subject, but none was found. Shortly after this, the opportunity of x-raying the chests of a group of welders presented itself. This particular plant made various sizes of steel tanks, the seams being welded with the use of coated electrodes. Before 1932, however, all of the welding had been done with bare metal rods. The metal used in the tanks was a low-carbon steel.

A total of 26 men were examined in the early months of 1935 and five were found to have x-ray appearances simulating early silicosis, after an average exposure of 18 years. The shortest exposure was 15 years and the longest 22 years. In none of them was there any physical impairment, no shortness of breath even on excessive exertion, and no tuberculosis. Except for the x-ray appearances, these were perfectly healthy men in every respect.

An additional five were found to have earlier lung changes simulating a pre-silicotic x-ray appearance. Also in none of these five were any other abnormalities found and their average exposure was 19 years. All 10 in whom these x-ray changes were noted had one thing in common; namely, they had spent at least two full years working in confined and unventilated places, mostly in welding the seams on the inside of the tanks. Others in the same plant who had done no confined work but who had been welding just as many years, showed no such changes.

Since that time the author has had the opportunity to examine the chest films of other groups of welders. The largest group was one from a large shipbuilding yard, in which several of the men had had exposures of 20 years to gas and electric welding fumes. None of these showed any changes on the x-ray films. This was very surprising until it was learned that they worked in confined spaces on only very rare occasions. Several other groups we have seen have showed none of these lung changes and in these also the welding was done in large airy rooms. Inquiry among other industrial medical men who had x-rayed welders revealed that no such lung appearances had been found. A large industrial concern in Pittsburgh had found none among several hundred who had been x-rayed. Furthermore, no case reports had appeared in the literature up to that time to confirm these findings.

In the April 4, 1936, issue of *Lancet* appeared a report entitled "X-Ray Appearances of the Lungs of Electric Arc Welders." It was written by two English physicians, Drs. Doig and McLaughlin,[10] in which they reported lung changes in a group of 16 welders they had examined. Two chest film reproductions in their article show the same nodular appearances found in five of our welders. Their conclusions were as follows:

"1. The chests of 16 electric arc welders who have been engaged at the trade for periods varying from 6 - 16 years have been examined radiologically.

"2. In six cases the x-ray films showed fine nodulation over both lung fields; in three cases stippling was present over a more limited area; the remaining cases showed varying degrees of accentuation of the bronchial shadows, but no stippling. In no case was a completely normal radiogram obtained.

"3. Clinical examination of the chests revealed few abnormal signs.

"4. The alterations in the pulmonary or bronchial tissues underlying these x-ray changes have been set up by the inhalation of fume which arises during electric arc welding.

"5. The probable composition of the fume has been discussed.

"6. We wish to emphasize that these x-ray appearances have been found in men who are apparently in good health.

"7. Up to the present time we have come to no conclusion as to the exact diagnosis of the condition."

Their theories of the cause of these changes were centered in the coated rod. The rods they had analyzed had coverings containing asbestos and sodium silicate and they theorized that the high temperatures of the welding flame would doubtless alter the physical state of the asbestos fibers; that this altered asbestos might conceivably produce an atypical asbestosis in the lungs. They ventured a further possible cause in the nitrous fumes together with the superadded effect of fine iron oxide dust setting up small areas of chronic inflammation or fibrosis in the lungs. They also suggested the possibility of iron collections in the lung casting the shadows. They admitted that their theories were highly speculative and that considerable investigation was necessary before conclusions could be reached.

We have not felt that the causative factor could be attributed to the coatings of the welding rods used by our group of welders because they had been in use in this plant less than three years, bare metal rods having been used almost exclusively before 1932. Welding with the bare metal rod alone seemed to have been the cause of the x-ray changes seen in our cases. Because careful investigation established the fact that these welders had not had silica exposures in the past, it was definitely concluded that these changes were not silicosis.* Whether or not the asbestos and the sodium silicate in the rod coatings actually are producing fibrous changes in lungs which will not be disclosed until some time in the future is not known. Animal experimental work to determine the long-range effects of fumes containing these substances would seem advisable.

The welders whom we examined in 1935 have

* Since this paper was read, the author has made microscopic studies of the lungs of one of these welders, who died as a result of an accident. The only thing found to which the nodular x-ray shadows could be attributed was collections of ion-pigment within the lymphatics of the lung and arranged in nodular groups. No fibrous tissue could be demonstrated.[11]

been studied at one-year intervals since and in the three intervening years with the exclusive use of coated electrodes they have not shown an increase in the x-ray shadows. This may in part be accounted for by the fact that blowers now are used at the tank openings, so that the fume concentrations in the tanks are only a fraction of what they formerly were. It should be added, moreover, that the health of these men has in no way been adversely affected by these lung changes. They have no cough or shortness of breath and in none of them has there been any evidence of tuberculosis of the lungs. Moreover, the welders in this group, as well as others who have been examined, have repeatedly stated that they have had fewer head colds since they began their trade. Many who previously were very susceptible to colds have lost that tendency entirely. The explanation for this is not certain, but the beneficial effect of the ultra-violet rays may be a factor.

SUMMARY. If I have been too speculative in this discussion, it is because there still is so little about which one can be dogmatic. Perhaps some of the more theoretical hazards have been overemphasized; on the other hand, further experience may prove that others have been underestimated. With the very rapid development of the welding industry, improved types of electrodes are constantly being introduced. Those that contain known toxic substances should carry with them this information, so that special precautions may be taken to prevent the excessive inhalation of these fumes. Manufacturers of welding equipment might very well consider the development of a cooperative program of research in analysis of the fumes given off by the newer electrodes, which would be of benefit to the whole metal industry.

A few positive conclusions may be drawn from information now at hand:

1. Twenty years of welding experience with electrodes in use during that time seems to indicate that electric welding is not a hazardous occupation provided the fume concentration is kept below a certain level.

2. The danger level of concentration appears to be considerably higher than the concentrations of fumes usually encountered in moderately large and fairly well ventilated rooms.

3. As newer types of welding materials are introduced, the fumes may approach danger levels at lower concentrations, such that ordinary room ventilation may not suffice.

4. Welding of any type should not be done in confined spaces without the use of exhaust ventilation, even for short periods of time.

5. The lungs of welders do not appear to be more susceptible to tuberculosis.

6. Welders generally have reported that a previous susceptibility to colds disappeared after they began their welding trade.

7. A cooperative program of research is recommended, so that newly developed hazards may be anticipated before they are able to do irreparable damage to those who must work with them.

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Appendicitis

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WITHIN recent years there has been so much written about appendicitis that it would seem that this subject should have evolved complete unanimity of opinion among surgeons as to the proper time to operate and to have thoroughly established the proper method or methods of operating.* However trite the subject may be, nevertheless, it is a perennial and fruitful field for controversy. For each of the past three decades, there seems to have been a gradual swaying from one extreme to the other in dealing with acute appendicitis. Thirty years ago the tendency too often was to wait for the subsidence of the attack and operate during the interval. Perhaps nowhere in this country was there such a diversity of opinion as here in the city of Chicago. Ochsner had promulgated the idea of waiting on certain types of cases until there should be a subsidence of symptoms, while Murphy, heading the other camp, was insistent that every case of appendicitis should be operated upon as soon as the diagnosis was made. In a personal interview with Dr. Ochsner a short time before his death, he told me that he had never intended a dilatory policy as an elective method of treatment but that at a time when transporta-

* Presented at the Forty-Ninth Annual Meeting of the American Association of Railway Surgeons, Chicago, September 20, 1938.

tion of patients to the hospital was difficult and often impossible and when surgical aid was not available he formulated the principles of the "Ochsner treatment" as being most desirable until such time as surgical assistance could be rendered. It was unfortunate that there was a misconception of the true intent of Dr. Ochsner's observations, because so many physicians looked upon it as an elective method of treatment and delayed advising operation until many of these cases had gone on to gangrene, rupture, local abscess formation or general peritonitis.

Following this period of surgical inertia, and largely due to the teachings of Murphy, there came about a decided reaction to this policy of *laissez faire,* and practically the universal custom was to operate on all cases of appendicitis as soon as the diagnosis was made regardless of the complications existing at the time of diagnosis.

In 1925 I read a paper before the American Medical Association on this subject and took occasion to send out a questionnaire to many of the most distinguished surgeons of this country and Europe as to their views on when to operate on cases of appendicitis regardless of the stage at which it might be seen. Out of 163 replies, with but one single exception, they were unanimous in stating that operation should be performed as soon as the diagnosis was made. Sir Arbuthnot Lane alone stated that he would "hesitate to operate in a case of spreading peritonitis."

Surgeons today are of one accord as to the advisability of immediate operation in cases of appendicitis prior to rupture but there is a wide divergence of opinion as to the advisability of operating in the presence of the complications mentioned above, the trend at this time in many places being toward surgical non-interference during this phase of the disease permitting abscesses to localize and operate at a considerably later date.

IT IS rather interesting to note how this trend of thought is influencing the mortality rate throughout the country. The waiting policy is, perhaps, more prevalent in other sections of the United States than it is in the south and, as having a direct bearing on the outcome, I give you the mortality statistics per 100,000 of population the different geographical areas of America:[1]

New England States	14.9	Rocky Mountain States	23.5
North Atlantic States	14.5	Pacific States	15.4
East N. Central States	16.1	South Atlantic States	11.3
West N. Central States	17.4	South Carolina	8.3
South Central States	14 5	Mississippi	10 8

In 33,000 collected cases from 1927 to 1930 there was a mortality rate of 5.3[2]. In Finney's series of 3319 cases, the mortality rate was 2.33%. Garlock reported 443 cases with a mortality of 4.6%. Reid reports 2921 cases with a mortality of 9.53% for the years of 1915 to 1921 inclusive and 6.3% from 1922 to 1933. Pool, reviewing 757 cases, reports a mortality of 7% up to 1930, and from 1930 to 1935 a mortality of 3.9%. While the mortality rate is gradually being lowered in most of the larger medical centers, yet it is a deplorable fact that in other areas or centers there has been a corresponding rise. If I remember correctly, a paper was read before this Association some three or four years ago in which a mortality rate of 10% plus was given.

In 1695 cases in our clinic for the past 10 years there have been 10 deaths with a mortality rate of 0.566%. I do not call attention to this because I believe that we are doing better surgery than others, but we have adhered to a strict routine of operating on all cases as soon as the diagnosis was made irrespective of the period at which they were seen. I think that the greatest single factor in this lowered mortality rate has been due to the fact that we have consistently and persistently preached in the State of Mississippi the doctrine of the necessity for immediate operation, and I believe that to the general practitioner goes the larger part of the credit for this lowered mortality rate in that we are seeing comparatively few cases of ruptured appendices at the time of admission to the hospital. The advocacy of delayed operation in cases of peritonitis will spread itself like a vicious infection through the rank and file of doctors who may misinterpret the basic factors and construe them to mean that these cases may be safely treated at home. In our series of 1695 cases there were 260 cases of ruptured and gangrenous appendices and of these, 116 cases were ruptured with more or less extensive peritonitis. In one case, rupture with widely spread peritonitis occurred within four hours after the onset of the attack. Of the 10 deaths, two were due to obstruction, one to gas gangrene of the abdominal wall, and one to pneumonia. Since the introduction of duodenal drainage, we have had no deaths from obstruction, nor have we had to resort to enterostomy.

Preferentially, we do a McBurney operation as we believe that there is less danger of spreading infection from a laterally placed incision than where a right rectus operation is resorted to. We believe that it is essential to remove the appendix in all cases of peritonitis, but in local abscess formation it becomes a matter for the judgment of the individual surgeon. If the appendix presents itself and can be removed without breaking up limiting adhesions, by all means do so, but should a search for the appendix entail breaking down of protective barriers, by no means should this be attempted.

The question of drainage is of paramount importance and I believe that inadequate drainage is, perhaps, responsible for the majority of deaths where peritonitis is present. Some surgeons are placing patients in a prone position without complete closure of the abdominal wall; this, I think, is unnecessary. For many years I have made it a practice to insert one or more drains to the bottom of the pelvis together with drainage of the appendiceal site. The wound is dressed with a not-too-thick covering of gauze and the nurse is instructed to change the dressings just as often as drainage begins to show through. If a too-heavy dressing is used, the drainage will not show

through and is apt to become clogged. In order not to allow the nurse too much lattitude of opinion as to when it might be necessary for the first 24 hours whether there is a seeming need for it or not. We believe that fairly large soft rubber tubing, fenestrated, is the best drain. It must be remembered that drainage is capillary and that just so soon as the dressing begins to become saturated, drainage stops. We believe that this procedure alone has resulted in a tremendous reduction of our death rate.

We scrupulously withhold fluids, orally administered, in our peritonitic cases relying on intravenous administration of glucose in normal salt. It is well, when giving large quantities of glucose, to give occasional doses of insulin as an examination of the blood frequently shows a marked hyperglycaemia.

Such rapidity of operating as is consistent with safety is greatly to be desired, as lengthy operation in grave cases undoubtedly adds to the danger. One authority reports the average duration for operation for general peritonitis as 43.3 minutes, 47.8 minutes for local peritonitis, 45 minutes for abscess, 58½ minutes for abscess and general peritonitis.[3] This, I think, is unduly prolonged. Make no explorations—get in and out with the least possible loss of time—and 20 minutes should be the maximum for uncomplicated cases of peritonitis.

If it is advisable to wait until local abscess has formed, why then do patients die? Statistics show that the mortality rate is in excess of 5%. It is because limiting adhesions, in so far as the general peritoneal cavity is concerned, have not formed. In a large percentage of cases they do form. We are all familiar with those cases in which, when the peritoneum is reached, the abscess seems, literally, to explode in one's face. These cases rarely die, because there has been a walling off of the general peritoneal cavity, but in a great many instances there is a walling off only of the abscess itself, either by omental or intestinal inclosure but there is no protecting wall against invasion of the abdominal cavity. Unlike cases of Salpingitis of Neisserian origin where the infectious processes lose their virulence in a greater or less length of time, these abscesses do not become sterile. Would it not seem, therefore, that the part of wisdom would suggest that the abscess be evacuated when in its incipiency rather then to wait for a massive collection of pus, which despite all precaution, may contaminate the general peritoneal cavity upon being opened.

In years gone by I have seen the devastating effects of peritonitis of appendiceal origin where operation was postponed. I can recall case after case where large areas of intestine were completely gangrenous, necessitating resection, cases in which there were multiple abscesses throughout the abdomen and in which death was inevitable. Happily, today, these types of cases are practically things of the past, but I find myself wondering if, in the mortality statistics of various sources, these cases that go on to a fatal termination without operation are reported as appendiceal.

The time has not yet come when the last word has been spoken on appendicitis. But out of the varied experience of different men and out of the discussions which follow the presentation of this subject, the day must ultimately come when surgical procedures are so definitely formulated as to make deaths from appendicitis surgical rarities. Until then, we must still impress upon the laity and the profession the fact that persistent abdominal pain is, *per se*, an indication for operation and that no case with such persistent pain should long remain out of the hands of a competent surgeon.

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Current Status of Silicosis

—and Other Occupational Diseases in Ohio—

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THE Ohio Silicosis Compensation Law (added as item 22 to Section 1465-68a of the General Code of Ohio, 117 O.L.) became effective July 31, 1937.[1] The Law defines as follows: "Silicosis shall mean a disease of the lungs caused by breathing silica dust (silicon dioxide) producing fibrous nodules, distributed through the lungs and demonstrated by x-ray examination or by autopsy."

The employee must establish *injurious* exposure to silica dust (silicon dioxide) in employment in Ohio preceding his disablement, for periods amounting in all to at least five years, some portion of which shall have been after the effective date of the Act. Compensation and collateral treatment expenses are payable only for total disability, temporary or permanent, or death, and only in the event that such disability or death results within one year after the last injurious exposure, but provided that in the event death follows continuous total disability commencing within two years after the last injurious exposure, "the requirement of death within two years after the last injurious exposure shall not apply."

For cases which accumulate five years injurious exposure after the effective date of the Act, compensation will then be paid as for other occupational diseases; but until that time, that is, where the total exposure amounts to less than five years after the Act became effective, the amount payable shall not exceed the sum of $500 plus $50 for each calendar month which may have elapsed after the effective date of the Act, but in no event shall exceed $3,000. (Parenthetically, up to December 31, 1938, the maximum compensation allowable in any one case, including disability or death, was approximately $1,350.)

In order to obtain compensation, application for same must be made within one year after total disability began or within six months after death.

The claimant is also barred from compensation

if he failed or omitted "truthfully to state, when seeking employment, the place, duration and nature of previous employment in answer to an inquiry made by the employer."

The same Act provided that the Industrial Commission appoint three referees to be known as "Silicosis Referees" who shall be licensed physicians in good professional standing, who by special duty or experience, or both, have acquired special knowledge of pulmonary disease, and at least one of whom shall be a roentgenologist. Any claim for disability or death due to silicosis may be referred to the Silicosis Referees for examination and recommendation with regard to diagnosis, the extent of disability and other medical questions involved with the claim.

The employee shall submit to such examinations, clinical and x-ray, as the Commission requires.

The Commission may also designate a duly licensed physician, pathologist, or other specialist, as may be deemed necessary, to make an autopsy examination and tests to determine the cause of death and certify written findings to the Silicosis Referees. The employee loses all rights and compensation should he refuse to submit to examinations or, in the event of death, that claimant refuses to permit autopsy examination and tests.

Reasonable compensation for Silicosis Referees and other specialists employed as well as expenses of examinations and tests are to be paid, if the claim is allowed, as part of the expenses of the claim, and otherwise from the Commission's surplus fund.

Silicosis Referee Board

UNDER date of April 21, 1938, the Industrial Commission[2] adopted a resolution by virtue of the authority conferred upon it by the legislative amendment, effective July 31, 1937, appointing three members of the Silicosis Referee Board. The appointees were:

Dr. Raymond C. McKay, of Cleveland, in charge of the tuberculosis unit of Cleveland City Hospital and assistant department head of the medical staff of that unit, as well as assistant clinical professor of medicine at Western Reserve University, also a member of the National Tuberculosis Association, the American Sanatorium Association, and the American Academy of Tuberculosis Physicians.

Dr. Joseph Anthony Muenzer, of Toledo, formerly of the staffs of St. Vincents' Hospital and the Lucas County Tuberculosis Hospital and with experience in clinical research in endocrinology at St. Anthony's Orphanage.

Dr. Wm. M. Doughty, Director of Radiology at Christ Hospital and Children's Hospital, Cincinnati, a member of the Board of Directors of the University of Cincinnati and a member of the American College of Surgery, the American College of Roentgenology, the American Roentgen Ray Society, and the Radiological Society of North America.

In the same resolution the Commission also instructed Dr. Sidney McCurdy, Supervisor of the Medical Section of the Commission, to organize the referees and aid them in facilitating the work to be performed.

Silicosis Case Reports

PRIOR to the date of the Act making silicosis compensable under certain conditions, the Industrial Commission had received only a few claims for silicosis annually. However, the Ohio Department of Health under the occupational disease reporting law, Section 1243, had been receiving some 40 to 50 reports of pneumoconiosis, chiefly silicosis, annually for a number of years.

We are indebted chiefly to Mr. John J. Nolan, of the legal division of the Industrial Commission, for the following analysis.

As of December 31, 1937, or five months and one day from the date the Silicosis Compensation Act became effective, the Industrial Commission had received a total of 26 claims. Of these, 20 were disallowed, one allowed, one was still before the Silicosis Board as of March 8, 1939, two had not become disabled, and the remaining two were still in the process of further investigation. The total of occupational disease claims for the entire year 1937 was 1459. Likewise, the Ohio Department of Health[3] had received a total of 21 silicosis reports on these same cases and a number of other pneumoconioses reports for the same period in 1937. For this year it had received a total of 1693 case reports of all occupational diseases, exclusive of 77 semi-official reports notified from the Industrial Commission but not yet received from physicians having to do with the cases (as required under the Reporting Act). In the 1693 reports were 19 additional silicosis reports received prior to August 31, 1937.

During 1938, the Industrial Commission received 142 silicosis claims of which 141 had also been reported to the Ohio Department of Health and as of March 8, 1939, 53 of which had been disallowed, and 24 allowed. The remaining 61 claims were still pending either before the Silicosis Board or in the process of investigation.

A special study of 146 claims filed to December 13, 1938, showed that 75 had been submitted to the Commission for hearing, of which 56 had been disallowed and 19 allowed. Of the 56 claims disallowed, 36 had been disposed of without referring them to the Silicosis Board because investigations had found no exposure to silica dust or no exposure after the effective date of the Act, July 31, 1937. Of the 56 disallowed claims, 20 had been submitted to the Silicosis Board and found to lack sufficient medical evidence for allowance. Of the 19 claims allowed, all had been considered by the Silicosis Board and found satisfactory.

Analysis of the above shows that, for the 75 claims submitted to the Commission, the ratio was approximately three claims disallowed to every one allowed. It is likely, however, that this ratio will become narrower in the future since the main reason for disallowance of many of the claims (no exposure after July 31, 1937) will disappear.

Recent Supreme Court Decisions

IN THE week of March 27, 1939, the Ohio Supreme Court rendered a most momentous decision by a four to three opinion regarding two cases of silicosis which had been appealed from the Court of Appeals of Cuyahoga and Marion Counties, respectively, both involving similar questions.[4] In both of the cases the employees, one deceased, had been sandblasters but were also employed at grinding castings. The decision, written by Justice Williams and concurred in by Justices Day, Zimmerman, and Hart, chiefly concerns the common law right of action growing out of an occupational disease not on the present compensation schedule, which is limited to 22 afflictions, fixed by the legislature and which first became effective August 5, 1921, with 15 afflictions. "By giving the words of the organic and statutory law their ordinary meaning and keeping in mind the purpose sought, the conclusion is inevitable that the right of action growing out of a non-compensable decision still subsists." It is also pointed out that "the court should avoid a strained construction which would leave many employees, who are blameless victims of their employer's torts, without either damages or compensation and absolutely remediless." Also "there has never been a statutory or constitutional provision expressly denying the right to maintain action growing out of a non-compensable occupational disease." "Since the first amended petition in the *Smith case* and the petition in the *Triff case* each state a cause of action, the judgments of the courts below will be reversed and the causes remanded for further proceedings."

Separate dissenting opinions were rendered by three of the justices. Justice Weygandt cited the failure to mention, in the majority opinion, "the extremely important explanatory statement prepared by a joint committee for the guidance of the voters of Ohio" when Section 35 of Article II of the Ohio Constitution was amended (1923), and voiced that, according to the majority opinion herewith, several clauses in this amendment were incorrect, such as, that the amendment assured "every worker compensation for injuries or death arising out of and in course of employment, backed by state law and state administration without necessity for recourse to law suits or employment of attorneys or payment of court costs;" "the amendment gives the worker an additional award without suits at law where the injury was the fault of the employer due to his failure to comply with specific requirements for the health and safety of the workers;" the amendment "wipes out the 'open liability'—giving recourse only to the compensation law for injuries or death arising out of and in course of employment," and "fixes a limit of financial liability in such cases and protects the assets and credit of the employer," and "defines 'lawful requirement' so as to bring it within the rule of reason, and gives the employer notice of his specific obligations under it;" and that "it was the apparent commendable desire of both employers and employees to clarify the law and put an end to the costly and futile strife that existed under the old order of things." Further that, of the many decisions from other states cited in the majority opinion, "none involves the constitutional language here employed."

Justice Myers dissented for the reasons that the court had previously, in the *Willard Storage Battery* and *Mabley & Carew cases*, declared the law of Ohio on this subject, which law had already "been changed in respect to silicosis as an occupational disease. For this court now to declare that those previous decisions were wrong is to play fast and loose with fundamental principles." "For over a quarter of a century the Workmen's Compensation Law has been recognized as a compromise for the establishment of justice as between employer and employee with respect to injuries."

Justice Matthias mentioned that similar cases previously before the court were decided adversely to the claims of plaintiffs, and that one case appealed to the Supreme Court of the United States was dismissed for want of a substantial federal question (298 U.S., 645). "The present decision opens a long standing controversy deemed to have been finally ended by the adoption of amended Section 35 of Article II of the state Constitution in 1923." Justice Matthias also called attention to the purpose of another section of the Ohio General Code (Section 1465-70) which "was to unconditionally abolish open liability of employers complying with the requirements of the Workmen's Compensation Act" now "in effect for the past twenty-six years," which was later amended to correct partial open liability by a "joint and harmonious action of the representatives of the employers and employees"; and "the effect of the decision in this case is to hold these statutory provisions unconstitutional." "Numerous practical questions will arise as a result of the decision in this case." For instance, "Under this decision, an action at law without limitation in amount of recovery may be maintained by employees suffering from silicosis who had been exposed to silica dust less than five years, for their disability is not compensable under the Workmen's Compensation Law. This is only illustrative of the many similar potential situations created by the decision in this case. Paraphrasing the language of an eminent jurist in a recent *cause celebre*, it may well be stated that if experience is any guide the present decision will give momentum to kindred litigation and reliance upon it far beyond the scope of the special facts of this case, for legal doctrines have, in an odd kind of way, the faculty of self-generating extension."

The Ohio Supreme Court also decided, the same week, that the setting up of four separate Regional Boards of Claims to hear Workmen's Compensation cases was constitutional, the vote again four to three.[5] The opinion was written by Justice Myers and concurred in by Justices Weygandt, Day, and Zimmerman. The dissenting Justices were Williams, Matthias, and Hart.

These Boards had been established in August, 1937, each with three members, and located at

Cleveland, Toledo, Canton, and Dayton. The Industrial Commission (located at Columbus), began to refer cases to them in January, 1938, since which time 6,184 claims had been so referred, upon which the Boards had taken final action on 3,460 cases. The law provides that after a decision is made by one of the Claim Boards, the injured workman may still appeal to the Industrial Commission, which in that event acts as an appellate body. The effect of these Boards is to speed up the hearing of claims and facilitate the appearance of both parties at hearings. Board members are also given an opportunity to see and talk to the injured worker. However, appeals from the Regional Boards are taken to the courts directly and not to the Industrial Commission.

The majority opinion found that the Regional Boards are not intended to supersede, or to be on a parity in all regards, with the Industrial Commission but intended to be an aid and auxiliary in investigating, hearing, and deciding claims. Where these Boards are sufficiently liberal in the allowance of claims and awards thereon, there will be no application for rehearing before the Industrial Commission itself, since the claimant alone has the right to make application for rehearing, but the retention of rehearing rights before the Commission gives a supervisory power to the Commission.

Relative Significance of Occupational Diseases

AS COMPARED with accidents, the *number* of occupational diseases as reported monthly by the Ohio Industrial Commission[6] is, of course, insignificant as may be seen from Table 1, devised from quarterly selected monthly reports during 1938. Figures for "Hot, corrosive and poisonous substances" are included as of collateral interest and will be referred to below.

TABLE 1.
NUMBER OF FATAL AND NON-FATAL ACCIDENTS REPORTED TO THE OHIO INDUSTRIAL COMMISSION, BY SELECTED HEADINGS AND FOR QUARTERLY SELECTED MONTHS DURING 1938.

	Total accidents		Total hot, corrosive and poisonous substances		Total occupational diseases	
Month	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal
January	113	15,556	7	786	5	122
April	81	14,157	4	751	3	93
July	81	12,986	0	745	7	79
October	77	14,289	4	837	5	114
Total	352	56,988	15	3119	20	408

Computation from Table 1 shows that fatal *cases* of occupational diseases (20) represented only 5.7% of the total fatal cases (352) listed in the four selected months—January, April, July, and October, 1938; also that the number of *non-fatal cases* (408) was only 0.7% of the total non-fatal "accidents" (56,988).

The classification "Hot, corrosive and poisonous substances" is unfortunate from the point of view of the toxicologist and the industrial hygienist who would like to know the exact number charged to corrosives and poisonous substances, separated distinctly from those due to hot substances. The breakdown, however, is not available in published form. Ohio is not the only state in which this unfortunate grouping is used and the matter should no doubt be seriously considered for change by statisticians connected with the various labor departments in the various states.

However, occupational diseases occupy a position of greater relative significance when *days lost* are considered, as may be seen from Table 2, in which we have also included "Hot, corrosive and poisonous substances."

TABLE 2.
DAYS LOST, BY SELECTED HEADINGS AND QUARTERLY SELECTED MONTHS, 1938.

Month	Total days lost	Total days lost: Hot, corrosive and poisonous substances	Total days lost: Occupational diseases
January	848,596	46,520	33,614
April	662,779	28,953	22,307
July	648,271	5,187	45,192
October	615,061	29,829	31,735
Total	2,774,707	110,489	132,848

In connection with Table 2, it should be stated that a fatal case is rated as equivalent to 6,000 days lost, and that the figures in the Table cover the totals for fatal and non-fatal cases. Computation from Table 2 shows that the days lost for occupational diseases were 4.8% of the total for all causes in the four selected months—January, April, July, and October, 1938.

The statistical division of the Industrial Commission has for many years sub-divided the *industrial hazards* associated with accidents and occupational diseases into 22 sub-headings (exclusive of a large group of miscellaneous) such as: Machinery, boilers,****, motor vehicles, handling objects,****, falling objects, hot-corrosive-and-poisonous-substances, occupational diseases, etc. The statistics give the actual number of *days lost* for these various sub-headings, from which occupational diseases (including the second calendar year's reports for silicosis) are found to occupy the relative position indicated in Table 3 for the various months of 1938 (in descending order of magnitude).

TABLE 3.
THE RELATIVE POSITION OF THE NUMBER OF DAYS LOST DUE TO OCCUPATIONAL DISEASES AS FOUND IN THE OHIO INDUSTRIAL COMMISSION'S 22 SUB-HEADINGS OF INDUSTRIAL HAZARDS DURING 1938.

Month	Relative position	Month	Relative position
January	7th	July	4th
February	6th	August	7th
March	6th	September	5th
April	8th	October	4th
May	6th	November	8th
June	4th	December	4th

Hence, occupational diseases as causes of days lost, and based only on those coming under the compensation schedule (but not necessarily all compensated), are found to stand considerably above the average in relative number of days lost

as allocated to the 22 groupings. No doubt the addition of non-compensable cases now made recognizable under the recent Supreme Court decision will further advance the relative importance of these diseases as a cause of days lost.

Summary and Conclusions

THE various features of the recent silicosis compensation law in Ohio are described. Obviously the law, while it grants compensation, is a very limiting one.

2. The appointment of the special Silicosis Referee Board, its personnel, and its organization under the Industrial Commission are described. It is the writer's belief that, despite the excellency of this organization, a minerologist and an industrial hygienist should also be added to this Board, giving it a total membership of five persons, the better to consider all phases of diagnosis of silicosis in the various claims presented to the Board. It should be stated, however, that the Commission has recently appointed a qualified ceramics engineer to make field tests and advise regarding methods to limit industrial health hazards, particularly in relation to silicosis claims. It is obvious of course that *ex post facto* determinations can have little material bearing on claims which are based on exposures in past years.

3. An analysis is given of the silicosis claims filed with the Commission to December 31, 1938, or approximately the first 17 months of experience under the recent silicosis compensation amendment.

4. Two very recent important decisions by the Ohio Supreme Court, affecting silicosis and occupational diseases and the constitutionality of the establishment of regional boards of claims, are analyzed, with excerpts chiefly from the dissenting opinions regarding the right to common law redress in the case of non-compensable occupational diseases.

5. The relative significance of occupational diseases is briefly considered in respect to number, number of days lost, and relative position to other accidental causes of days lost. From this it will be seen that occupational diseases are insignificant as compared to accidents in the number of claims, but constitute 4.8% of days lost, and occupy a position considerably above the average for days lost in the 22 industrial hazard groupings used by the Industrial Commission. One effect of the Supreme Court decisions will no doubt be to extend the relative position of occupational diseases in all of these relationships, at least for a time or until more attention is given to eliminating their causes. Another effect will probably be a further amendment to the compensation schedule in the nature of "blanket coverage."

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Treatment of Low Back Pain

—*By Regional and Local Analgesic Injections*—

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THE subject of low back pain may, on the surface, appear somewhat trite. Nevertheless, the innumerable "angles" and possibilities constantly being brought forth endow it with a certain freshness and interest which, we trust, becomes a saving grace.

For many years low back pain has been a problem to general practitioner and specialist alike. The frequency with which pain low in the back, in its intractible forms, is encountered in private and hospital practice, and with which it becomes the cause of compensable disability and litigation, lends this subject great practical importance. The knowledge of an additional and promising therapeutic approach, in our opinion, enhances its practical value.

The purpose of this paper is not to coordinate the various complex elements concerned in the diagnosis and treatment of low back pain, which has already been accomplished by many illustrious investigators. Here it will not be possible to do more than touch on certain particular phases of this subject as they have appeared to be of special importance to the therapy herein advocated. It is our aim, specifically, to (a) outline certain points of diagnostic importance; (b) offer a therapeutic approach the value of which has been proved to us by several years of clinical experience; and (c) attempt to rationalize our therapy so that the technique outlined may be employed with a clearer knowledge of the pathology involved, particularly how one may influence this pathology, in the relief of pain.

The indifferent therapeutic results obtained in low pack pain by many investigators as well as by ourselves led us to search for more constantly effective methods in the hope of insuring a greater and more lasting measure of relief. A study of the voluminous literature on this subject was be-

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* Eucupin Solution in Oil used throughout this study was supplied through the courtesy of Rare Chemicals, Inc., Nepera Park, N. Y.

wildering. Treatment ranged from conservative to operative measures. In the former, the effectiveness of the treatment commonly advocated frequently was found by us to be inadequate; in the latter, too heroic for routine adoption. Moreover, in a good number of instances it appeared that the therapeutic methods applied not always corresponded to the true etiological requirements. The excellent results obtained by us in arthritis by regional and local analgesic injections by means of aqueous procaine solutions, and solutions of anesthetic agents in oil,[1] led us to believe that by the adoption of similar methods in the treatment of low back pain parallel results might be obtained. We therefore set out to determine the value of analgesic injections, and particularly, of anesthetics in oil,* introduced either at the painful site or at the point of origin. This approach fitted somewhere between the two therapeutic extremes, and could be adopted without sacrifice of basic principles.

In treating these cases by such measures, we were greatly concerned with several problems. The question of the actual site of the pathology was important since one could not always take pain at its face value. Was this pathology bony in character, or merely due to soft tissue changes? Again, was the pain a manifestation of some underlying toxic or infectious process, or merely referred? If injections of analgesic solutions were administered, just at which point or points should these injections be given? Finally, how could we influence the underlying process, and what was the rationale? All these problems entered into each individual case, and had to receive proper consideration if any semblance of therapeutic unity was to be observed. A multiplicity of possible etiological factors seemed constantly to confuse the picture. Likewise, in order to follow this orderly principle, it was thought best to observe a certain routine in examination and treatment, regardless of any preconceived diagnosis. Particular attention was paid the following three regions of the spine:

1. Lumbosacral,
2. Lumbodorsal,
3. Sacro-iliac.

Lumbosacral Region

THERE are a number of pathological conditions in this region which are frequent causes of pain; arthritis of the lumbrosacral articular facets, compression of the lumbosacral intervertebral cartilaginous disc, lumbosacral malalignment, compression or irritation of the 5th lumbar nerve, lumbosacral strain, myofascitis, and a combination of these. The foregoing are the more common forms of pathology encountered in this region. Pathology in this area is a frequent source of pain at the lumbosacral junction, the iliac crest, both above and below the crest, as well as at the buttock and leg. The particular vulnerability of this region is due to peculiar anatomical components which render it and its related parts especially prone to disease processes. Ayers[2] enumerates these as follows:

(a). Junction of a mobile, flexible spine and an immobile body, the sacrum.

(b). Sharp change in the direction of the spine at this point, thus creating for the 5th lumbar vertebra an especially hazardous position.

(c). Presence of an intervertebral cartilaginous disc caught between the 5th lumbar vertebra and sacrum. Liability to compression, chondritis, etc.

(d). Shape of the lumbosacral articular facets and their relation to strain on this joint, and on the contours of the intervertebral foramina.

(e). Distinct relative decrease in size of the 5th intervertebral foramen as compared with other foramina, and corresponding increase in size of the 5th lumbar nerve root, with possibility of compression and irritation. Position of this root between the articular facet and the intervertebral disc; its anterior position in relation to the posterior articulation between the 5th lumbar vertebra and sacrum, with greater possibility of irritation or compression. Additional possibility of irritation of the 5th root because only partially protected by arachnoid and spinal fluid.

Von Lackum[3] from actual observations on cadavers compares the lumbosacral joint to a fulcrum upon which the weight of the body rests. There is here the union of a mobile spine and an immobile body, the sacrum. Any abnormal change of the spine at this point, such as lordosis, any assymetry of the articulations of the 5th lumbar vertebra, or "anything which disequalizes the distribution of the body weight at this point, such as a hip dislocation or short leg, accentuates this instability." Such vulnerability is counteracted by the presence of ligaments and the intervertebral disk. Thinning of the disk at this point decreases its effectiveness as a shock absorber.

Lumbodorsal Region

HERE, as in the lumbosacral region, pathological changes are apt to occur which render this part of the spine particularly vulnerable. Injuries, or disease processes, may manifest themselves in arthritis of the lumbodorsal articular facets, fibromyositic changes, lumbodorsal irritation, and neuralgic phenomena involving the 1st lumbar and 12th thoracic nerves, particularly. Judovich and Bates[4] enumerate the following anatomical points which expose this region to abnormal changes:

(a). Vertebrae of the lumbodorsal region are smaller and weaker and yet must bear almost as much weight as the lumbar spine.

(b). Segments above and below the lumbodorsal region are comparatively fixed. (Areas of the spine where fixed and movable portions join each other are the areas most subject to strain, fracture, dislocation, etc.)

(c). Position of the lumbodorsal area near the middle of the spine enables a greater length of leverage to be brought to bear upon it than upon any other part of the spine.

(d). The lumbodorsal segment bears the weight of the body superstructure at angles more variable than any other part of the spine.

(e). The lumbar enlargement of the spinal cord

in this region makes the vertebral housing relatively smaller.

(f). Predisposition to scoliosis, lordosis.

A study of the above anatomical features bears a striking similarity to those of the lumbosacral region, ergo the frequent involvement of the two areas.

Sacro-iliac Region

WITHIN the past few years we have come to believe that this very much maligned joint is not so frequently at fault as we have previously supposed, conversely, that the lumbosacral articulation is more frequently involved. Indeed, Ayers,[2] quoting Key, affirms that sacro-iliac strain is only one-quarter as common as lumbosacral strain. Again, Ayers calls attention to the important contribution of Dansforth and Wilson on the anatomy of the lumbosacral and sacro-iliac regions. These investigators concluded that there is much greater chance for nerve involvement in the lumbosacral than in the sacral-iliac spine. It must be admitted nevertheless that pain in or about the region of the sacro-iliac synchondrosis is extremely common. Gluteal pain, for instance, is frequently encountered. Involvement of the structures around the sacral-iliac joint, such as muscles and ligaments, may be, and often is, frequently mistaken for sacro-iliac disease.

Pain in the buttock and in the region of the sacro-iliac may be due to the following conditions:

(a). Sacro-iliac disease.

(b). Irritation of the 5th lumbar nerve.

(c). Spasm of the piriformis, levator ani, coccygeus group of muscles.

(d). Myofascitis.

(e). Strain or pathology in the ligaments about the sacro-iliac joint.

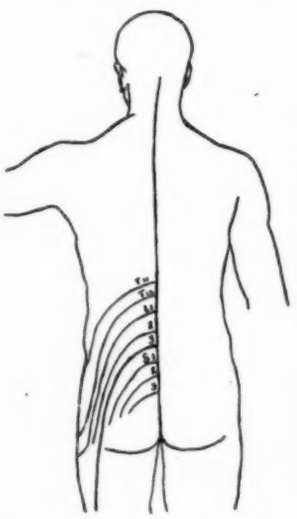
(f). Irritation of the 12th thoracic and 1st lumbar nerves.

Any one of the above conditions may give origin to the familiar picture of gluteal pain. Discovery of the true etiological factor, however, is not always easy in this condition. This may be ascertained only by knowledge of the various elements concerned in the production of this syndrome.

True sacro-iliac disease must be differentiated first of all from a neuralgia of the 12th thoracic and 1st lumbar nerves, since these nerves give branches to the buttock, and irritation of these structures may closely simulate sacro-iliac disease. In point of fact, the 5th lumbar nerve gives fibers to the gluteus medius and minimus. Irritation of these fibers may give origin to the characteristic pain of which these patients so frequently complain, i.e., pain just below the crest of the ilium.

Simpson,[5] Thiele,[6] and Freiberg and Vincke,[7] have called attention to spasm of the piriformis, levator ani and coccygeus muscles as a possible cause of gluteal pain, and showed that when the coccyx or coccygeal joints have been injured, or when the surrounding tissues have become the seat of inflammation, any contraction of muscles attached to the coccyx may give rise to coccygeal pain, as well as pain in the gluteal region.

In a series of 87 patients studied by Thiele, 30 complained merely of coccygeal pain, in 17 the pain was confined to the supragluteal region or down the back of the thigh, and in the remaining 40 there was combined coccygodynia and pain in the supragluteal region or down the back of the thigh. Both Freiberg and Thiele have noted that the lower border of the piriformis is "sharp and tendinous," therefore contraction of this muscle may compress the sciatic nerve against the lower border of the foramen formed by the sharp edge of the sacrospinous ligament and the upper borders of the gemellus superior and coccygeus muscles. In like manner, spasm of the piriformis may impinge the superior gluteal nerve against the lower border of the gluteus medius. When such pathology is found pressure on the sciatic nerve through the rectum elicits sharp pain radiating down the leg.



Distribution of Cutaneous Nerves in Lower Back (After Cunningham)

(The medial branches of the lower six thoracic nerves are distributed chiefly to the multifidus and Longissimus dorsi. The medial branches of the first three lumbar nerves are muscular and innervate the deep muscles of the back. The 4th and 5th lumbar nerves usually supply only muscular branches to the longitudinal muscles of the back. The first three sacral nerves supply internal muscular branches to the mutifidus spinae.)

The Neuralgic Syndrome

FROM personal observation, substantiated by a study of the literature, this syndrome as a factor in low back pain has received insufficient attention, while strain, myofascitis and other such conditions have been over emphasized, perhaps. Hence, the treatment of this syndrome has been either completely disregarded or relegated to obscurity. Carnett[8] and Bates[9] have made exhaustive studies of the neuralgic nature of certain types of back pain, and speak of parietal or intercostal neuralgia as being commonly encountered. Judovich[4] mentions particularly a 1st lumbar and 12th thoracic nerve neuralgia associated with pain in the gluteal region.

1st Lumbar Nerve Neuralgia

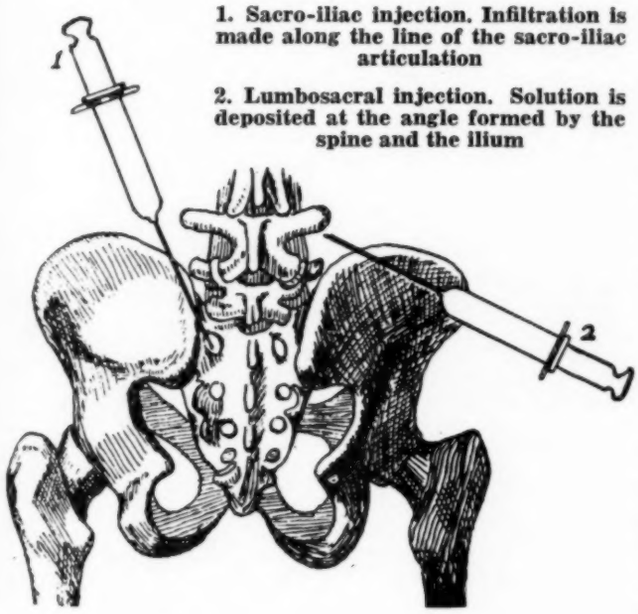
LUMBODORSAL irritation in the region of the 1st lumbar and 12th thoracic nerves due to pathology and irritation of these structures gives rise to the definite syndrome of 1st lumbar neuralgia.

Judovich states that the parietal distribution in this condition is supplied by the 12th thoracic and 1st lumbar nerves. Occasionally the 10th and 11th thoracic and 2nd and 3rd lumbar nerves are also involved.

According to the above investigator the pain

pattern in 1st lumbar neuralgia is as follows: Posteriorly, an area over the gluteal region, limited above by the crest of the ilium, below by the intertrochanteric line, mesially by the sacro-iliac line, and laterally by the posterior margin of the great trochanter; anteriorily, parietal tenderness over McBurney's point, over an area parallel to and below Poupart's ligament; and by a triangular area high up on the inner aspect of the thigh; last, definite tenderness over the 1st lumbar nerve trunk, paravertebrally. In order to understand this "pain pattern" which is of definite importance in any consideration of backache, one must be acquainted with the distribution of both the 12th thoracic and 1st lumbar nerves.

In gluteal pain this syndrome is of major significance, since the pain may be a manifestation of involvement of structures higher up and not at the apparent site of pathology. When such is the case, treatment should be directed at the source rather than at the gluteal region. A number of



1. Sacro-iliac injection. Infiltration is made along the line of the sacro-iliac articulation

2. Lumbosacral injection. Solution is deposited at the angle formed by the spine and the ilium

such cases have come under our observation in which baking and massage had been applied at the buttock, but proved unsuccessful. These same cases responded quickly to injection of the 12th thoracic and 1st lumbar nerves.

In this syndrome, pressure below the costal margin, about two inches from the mid-spinous line, elicits vivid tenderness. This tenderness should disappear together with the pain in the gluteal region following injection.

Again, a number of such cases had been diagnosed as sacro-iliac arthritis. From the foregoing, it is apparent that in such a condition one must rule out a 1st lumbar neuralgia, particularly in borderline cases.

In true sacro-iliac disease associated with pain in the leg it has been found that the 4th and 5th lumbar and 1st and 2nd sacral nerves are usually involved. In the majority of cases the 5th lumbar and 1st sacral are at fault particularly.

It is incumbent, therefore, whenever presented with a possible sacro-iliac arthritis to rule out a 1st lumbar neuralgia. If there is doubt as to whether one is confronted either with a sacro-iliac condition or a 1st lumbar neuralgia, the latter is eliminated by a diagnostic block, injecting paravertebrally the 12th thoracic and 1st lumbar nerves with procaine. Should the latter be the case the pain is quickly relieved.

Another problem frequently met is whether the gluteal pain is caused by pathology in the lumbosacral region or is due to involvement of these selfsame structures, 12th thoracic and 1st lumbar nerves. It is important, here, to keep in mind that the 5th lumbar and 1st sacral nerves often overlap in pain pattern that of the 1st lumbar. It is therefore necessary to block the 1st lumbar nerve, eliminating the tenderness which may be elicited in the areas above mentioned, as supplied by the last thoracic and first lumbar nerves. Should tenderness in spite of this still be elicited, the 5th lumbar nerve is involved. Furthermore, one should keep in mind the possibility of involvement of both the 1st and 5th lumbars. In such a case both structures will have to be injected, bearing in mind that the 5th lumbar is almost wholly a motor nerve and that care must be exercised in order to avoid a motor disturbance of the corresponding extremity.

Rationale of Analgesic Injections

FROM the foregoing one realizes that pain low in the back is due to a number of widely dissimilar conditions; not only to involvement of bony structures, but muscles, fasciae, ligaments, nerves, cartilage, connective tissues, and blood vessels as well, and that any one of these structures when modified, either directly or indirectly, may give rise to the symptom of pain. The derangement of static forces, or malalignment of the bony structures, may give rise to pain by inducing strain in ligaments and muscles, injury to cartilage, pressure on nerves, growth of connective tissue, disturbed circulation, or some such mechanism. Conversely, bony pathology itself may be secondary to tissue changes such as strained ligaments or spastic muscles.

Evidence points to the fact that the majority of low back conditions are not skeletal in origin but due to some indirect irritative mechanism. This, perhaps, may satisfactorily explain the successful response to injections of analgesic solutions.

Myofascitis is an important cause of this irritation in the production of low back pain. In this condition the fascial planes are involved and inflamatory lesions due to trauma or infection result in fascial adhesions. Consequently impingement or stretching of the nervous network by the connective tissue stroma which surrounds it results in pain and limited mobility. Any "shearing force," as in trauma, may result in the production of low back pain and disability. Gratz,[10] was able to demonstrate anatomically the presence of adhesions involving the lining of the fascial space and the structures encased by it. In locomotion, their restrictive mechanical action is apparent. In pneumofasciograms of normal subjects the air is evenly distributed within the fascial planes. In

the rheumatic syndrome, the air is unevenly distributed. In myofascitis, there is, according to this investigator, thickening of the opposing fascial surfaces, with adhesions. Frequently the synovial covering of the muscles is involved. This creates an important problem in normal locomotion.

Heat and massage are helpful because they usually cause a release of secretions in the tense contracted or adherent fascial coverings with relief of pain. In short, a condition more closely approaching the normal is attained. By the same token we feel that injections of analgesic solutions, particularly the oily solutions, accomplishes as much if not more. X-rays in which radio-opaque substances, such as iodized oil, have been injected show the oily solution to diffuse readily. This diffusion occurs in the fascial spaces and pockets with the breaking up of adhesions and its very presence insures the separation of the spaces. The nerves are bathed by this protective, oily substance, with the relief of pain. Thus a vicious cycle is interrupted. We know by experience among arthritics[1] that interruption of this cycle frequently results in relief of spasm, congestion and all the other factors which sustain this abnormal picture.

Further in those cases in which there is definite bony pathology results obtained by us indicate that in selected cases complete symptomatic relief is obtained. This is accomplished, we believe, not by any essential change in the bony relations, but by influencing the secondary tissue changes accompanying such pathology. The literature is replete with a variety of such changes which either follow or precede concrete bony pathology as evidenced by x-ray.

Nathan[11] and Carnett[8] speak of nerve irritation in spinal arthritis as being due to an "inflammatory exudate" in the intervertebral foramina or in the epidural space pressing on the spinal nerves or their roots.

Hodges and Peck,[12] discussing the radiation of pain in the lower extremity, believe that the pain is radiated primarily by a reflex mechanism.

Putti,[13] Williams,[14] and Danford and Wilson,[15] on the other hand explain the characteristic complaint of peripherally radiating low back pain on the basis of direct nerve irritation.

Badgely[16] in 447 cases came to the conclusion that the mechanical conception for the pathogenesis of sciatic pain is not applicable for the entire group of cases studied.

Duncan[17] reviews the records of 500 consecutive patients with the predominating complaint of distress in some region of the lower part of the back. In two-thirds of these patients the roentgenograms were reported as negative, while the other third showed either a sacralization of the 5th or 6th lumbar transverse process, mild arthritic changes, or a slight scoliosis to one or the other side.

Badgley[16] makes the further observation that the type of skeletal change observed in the roentgenogram has no definite control over the extent and location of the radiation pain. He also states that "one might anticipate in this comparion that the cases with marked lumbosacral pathology would demonstrate the greater preponderance of cases with lumbosacral tenderness, which did not prove to be true."

Discussion

THIS study was begun in a group of metropolitan hospitals four years ago. Most of the clinical material, however, was gathered in the arthritis clinics of St. Mary's and Brooklyn hospitals. We are profoundly grateful to Dr. George Anderson, Chief of the Arthritis Clinic of the Brooklyn Hospital, for his cooperation and counsel, and for his broad understanding of the problems of internal medicine and its present day limitations in the relief of pain.

At the beginning of this study, we felt that a great many of the conditions in which low back pain was the major complaint were probably due to a neuro-muscular mechanism, and that any means which might in some way affect this mechanism should bring about a satisfactory response. As aforementioned, injections of procaine were given with variable results. In the unresponsive cases a synthetic oily analgesic agent was injected for a more prolonged anesthetic effect. Anesthetics in oil, in spite of certain drawbacks, were found to be definitely superior to procaine hydrochloride. In the more intractible cases in which every known conservative means of relieving pain at our disposal had failed, mixtures of alcohol-procaine were employed.

Caudal injection of lipiodol showing infiltrative power of medicated oils

Since the diagnosis was often of a complex nature and varied with the individual case, the technique of injection necessarily also varied with the case at hand. One of the most common reasons for the admittedly poor response to treatment was either a mistaken or an incomplete diagnosis, or a shot-gun form of therapy which did not correspond to the nature of the pathology involved. We therefore were as diligent as our knowledge permitted not only to establish a diagnosis of character and location, but attempt, as well, to use our injections in as specific a manner as possible, not losing sight

Table I.
Diagnosis Of Low Back Pain In 46 Cases

Question-able	Myofas-citis	Lumbo-Dorsal Irritation with neur-algic syn-drome	Lumbo-Sacral Irritation with neur-algic syn-drome	Sacro-Iliac Disease	Radicu-litis	Coccy-godynia	Low Back Pain with chronic Hip Disease	Mixed Path
2	10	12	7	4	4	1	2	4

of the broad principles so frequently involved in the production of low back pain. Thus in cases of sacro-iliac disease specific sacro-iliac injections were given either with procaine 1% or, more usually, the oily solution, along the course of the synchrondrosis. In myofascitis the solution was deposited in and about the painful areas. In lumbodorsal irritation with a 1st lumbar nerve syndrome injections were given as close to the nerve itself as possible by paravertebral intramuscular injection. If unsuccessful, the nerve was blocked with alcohol-procaine in the proportion of 1 to 3. In lumbosacral irritation with its usual neuralgic train, a specific lumbosacral injection was given, depositing the solution at the angle formed by the spine and the iliac crest. The paravertebral block with the alcohol-procaine mixture was reserved for the unresponsive cases.

In those cases in which low back pain was associated with chronic hip disease, a periarticular hip injection was given. In such patients tenderness was usually elicited at a point posterior to the greater trochanter, and injection made at this site, depositing the analgesic solution fan-wise into the muscle attachments, thus relieving periarticular spasm.

In coccygodynia injection was made about the sacro-coccygeal joint, with the index finger of the opposite hand inserted into the rectum.

Finally, in those cases in which the pathology was of a more complex and extensive nature a combination of these various procedures was adopted. In a number of such patients only constant patience and repeated injections in the various sites produced satisfactory results.

The comparatively superior response obtained with injections of the anesthetic in oil over procaine hydrochloride were attributed to the more prolonged analgesic effect. According to Bjilsma[18] traces of the anesthetic are found in the tissues four days after injection. Studies made with oily anesthetic solutions show that the oil vehicle, while diffusing readily, is more quickly absorbed, leaving the anesthetic to exert its action on the tissues. The permanent or prolonged relief of pain cannot, however, be ascribed to the relatively short period of anesthesia involved, but primarily to the interruption of a vicious pain cycle. Whenever conditions permitted, a complete x-ray study of the lower spine, antero-posterior, lateral and oblique view with examination of the lumbosacral junction with restricted beam were made.

Rectal examination to eliminate presence of piriformis and levator ani spasm also was made in certain specific cases in keeping with the teachings of Thiele[6] *et al* [7]. The abduction test for contracted fascia lata was found to be positive in only one instance in our series. In cases of low back pain accompanied by bilateral sciatic irritation the remote possibility of herniation of the intervertebral disk was kept in mind.

All cases not showing intraspinal pathology, as well as those demonstrating positive x-ray findings, were injected and made part of our series.

Table II.
Results Of Analgesic Injections In 46 Cases

	Symptom-Free	Definite Improve-ment	Unim-proved	Sl. or Mod., Temp. or Doubtful Improve-ment	Impossible to Evaluate
	22	7	2	8	7
Procaine—1%	6	2	–	2	2
Anesthesia in oil	5	2	–	2	1
Unimpr'd c Procaine	6	2	–	1	–
Impr'd c Anesth. in oil					
Impr'd with Procaine	3	–	–	–	–
+ Anesthesia in oil					
Alcohol-Procaine Block	2	1	1	–	1
Unimpr'd with Proc. or Anesthesia in oil	–	–	1	3	–
Untreated Cases	–	–	–	–	3
Duration of Disease	2 mo-20 yrs.	1 mo-15 yrs.	3-15. yrs	1 mo-7 yrs.	6 wks-30 yrs.
Period under Observ.	1 mo-1 yr.	1 mo-3 yrs.	3 mo-1½ yrs.	3 mo-1 yr.	2-6 mos.

Total No. of Cases Treated 46
Symptom-Free or Definitely Improved ..... 29(63%)
Unimproved 2
Sl. or Mod., Temp. or Doubtful Improvement 8
Impossible to evaluate 7

Among these latter, in spite of the presence of bony changes, we were more than once surprised by the beneficial results obtained. By way of illustration, one such case showed narrowing of the intervertebral space between the 5th lumbar and 1st sacral segment, bilateral sacralization of the 5th lumbar vertebra, changes in the articular facets and lipping of all the lumbar vertebrae. This case, in spite of a history of seven and a half year's duration, and numerous previous consulations, received slight relief with procaine but total benefit from three injections of oil anesthetic. A slight temporary recurrence of pain on exertion, such as in playing golf, was eliminated by proper fitting arch supports and shoes.

Postural abnormalities cannot be too greatly emphasized in the management of these cases. If one is to derive full benefit from analgesic injections, great attention must be paid to the presence of changes in the normal contours of the spine, pelvic balance, pathologic changes in the hips and knees and to the correction of flat or weak feet by exercises and orthopedic support. The possibility of a recurrence if such important phases of treatment are overlooked must be borne in mind.

The syndrome of low back pain with radiation to the buttock and leg is a common one. Pain in the leg did not always disappear following injection at the supposed origin of pain. This was explained by possible secondary changes in the sheath of the sciatic nerve and additional injections of 1% procaine perineurally at the painful site or along the course of the nerve followed.

Analysis of Failures

AMONG the failures are included those cases which were unimproved, slightly or moderately improved, and those which responded with a temporary or doubtful improvement.

Cases 1, 2 and 3: Three cases of Marie-Strumpell disease with peripheral pain. In all three cases pain was apparently due to a radiculitis following definite gross irritative changes. All were advanced and displayed a board-like rigidity of the entire spine. It was felt that here we were dealing with a terminal residual condition. One other such case with radiation to the intercostal space had relief of spinal pain following injections of procaine and oily anesthetic solutions. A general systemic improvement accompanied treatment with gold salts.

Case 4: This case had an old fracture of the transverse process of the 5th lumbar vertebrae with proliferation in both sacro-iliac joints. Pain was finally controlled by transacral neurolytic injections of alcohol-procaine. This case though improved is still under treatment.

Cases 5 and 6: Both cases manifested symptoms of a perennial cold. X-ray of sinuses in one showed both a frontal and antral infection, in the other, findings were negative. Here we felt we were dealing with a definite causative factor with a "stoker action" and no results would be obtained unless infection was controlled.

Case 7: Sacro-iliac arthritis with radiation of pain in leg. Here a complete paravertebral block was done under full surgical asepsis followed by injections of the sacro-iliac joint with procaine and anesthetic in oil. Improvement for several months with pain returning on resumption of work.

Case 8: Obese. Picture of metabolic imbalance. Here it was felt that poor results were attributable to failure to lose weight. Orthopedic correction disregarded.

Case 9: Loss of space in both sacro-iliacs with slipping of right sacro-iliac synchondrosis. Four sacro-iliac injections with procaine 1%. Unsuccessful. Subsequently received alcohol-procaine (1:3). Transacral block for relief of sciatic pain with partial results .

Case 10: Myofascitis. House painter. Poor results probably due to continued work during treatment.

Table III.

	X-Ray + Cases	X-Ray — Cases	No X-Ray Report
Symptom-Free or Definitely Improved 29	11	3	15
Unimproved 2	2	-	-
Sl. or Mod., Temp. or Doubtful Imprvt. 8	5	3	-
Impossible to Evaluate 7	3	2	2

Among the impossible to evaluate were several cases in which there was a strong psychoneurotic element. It was thought best to exclude these from our series.

Summary

A SERIES of 46 patients suffering from low back pain with or without sciatic radiation were treated by local and regional analgesic injections of procaine 1% or Eucupin Solution in Oil.

2. Approximately 95% of the cases gave a history of intractible pain over a period ranging from one month to 30 years. Four cases had a duration of 15 years or more.

3. Twenty-nine of the cases were x-rayed. Among these 21 displayed positive x-ray findings.

4. Twenty-two became symptom free. Seven showed definite improvement and eight were slightly or moderately improved or showed a temporary or doubtful improvement, two were unimproved and seven could not be evaluated.

5. All cases received a general as well as a local examination with search for a possible etiological factor.

6. Patient was first injected with aqueous solution of procaine 1% followed by the anesthetic in oil. Those appropriate cases which gave a poor response received alcohol-procaine block, as a court of last appeal, after all conservative measures had failed. In general it was felt that the anesthetic in oil was the most effective agent in relieving pain and reestablishing function.

7. In our opinion regional and local injection therapy used properly is superior to other means

of relieving pain but does not exclude conservative general or basic treatment. These injections should find a larger appreciation in industrial organizations where traumatic low back pain is common.

8. Whenever possible, a search for a remote etiological factor should be made.

9. Injections should be given with as complete an understanding as possible of the factors underlying low back pain, and should be intimately related to the source of pain.

10. So-called "shot-gun" injections are to be deplored.

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Total Avulsion

—*of the Arm and Posterior Shoulder Girdle with Recovery*—

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PARADOXICAL as it may seem, a thorough search of medical indices reveals an imposing number of cases, such as herein reported, as occurring between the years 1732 and 1884. Since the latter date, however, medical history seems to record only three indirect references to similar but not parallel cases. In 1918 Doctor Gregory Wall, of Tulsa, Oklahoma, reported an exactly similar case of arm and posterior shoulder girdle injury. Fatal and other cases may have occurred without having been reported.

One might be momentarily perplexed to understand why this particularly tragic type of accident has not increased rather than diminished in frequency with the advent of a progressively mechanized era. The infrequency of occurrence constitutes a glowing tribute to the constructive efforts of industrial surgeons whose recommendations have eliminated from power-driven machinery the set screw and revolving shaft and other risk hazards which formerly exacted from the unprotected worker a toll of traumae and deaths.

Since severe injuries to the shoulder joint challenge the resources of the surgeon, a brief review of the anatomy and function of this somewhat obscure joint may render less difficult a complete understanding of the machanics of the grave accident herein recounted. Lovett entertains the idea that as man in his evolutionary period assumed the upright posture, the shoulder was transformed from a weight-bearing to a weight-carrying structure, and that consequently the joint was transformed from an asset to a liability. Thus the shoulder joint from phylogenetic influences became an organ of prehension and acquired a range of motion in three planes at right angles to each other. The ball and socket joint, held away from the trunk by the shoulder girdle to further increase the range of movements of the arm, seems to be an adaptive result to facilitate the development of the grasping function to such a degree of perfection that this is the basis of man's commanding position on earth.

The shoulder joint is maintained chiefly by a powerful musculature which supplements the action of the rather loose capsule. The projecting arch of the coracoid, the acromium and coracoid ligament, affords protection against stresses. Gray describes the peculiarities of the joint as: (1) "The large size of the head of the humerus in comparison with the depth of the glenoid cavity, even as supplemented by the glenoid ligament;" (2) "The looseness of the capsule of the joint;" (3) "The intimate connection of the capsule with the muscles attached to the head of the humerus;" and (4) "The peculiar relationship of the biceps tendon to the joint."

Of the two bones comprising the shoulder girdle, the scapula, found on all mammals, is the most spectacular. In man, as compared to lower forms, the scapula is characterized by a greater proportionate length of its vertebral margin or base. The clavicle merely holds the joint away and posterior from the chest. The scapula, by its muscular attachments accords to the shoulder girdle an infinite variety of niceties of movements.

The scapula affords attachment for 17 muscles. To the anterior surface is attached the subscapularis—to the posterior surface the supraspinatus, infraspinatus, spine, trapezius, deltoid. To the superior border is attached the omohyoid—to the vertebral border the serratus magnus, levator anguli scapulae, rhomboideus (minor and major) —to the axillary border is attached the triceps, teres minor and major—to the apex of the gelnoid cavity; long head of the biceps; coracoid process, short head of the biceps, coracobrachiolis, and pectoralis minor. To the inferior angle there are occasionally found attached a few fibers of the latissimus dorsi.

According to the opinion of Dr. H. B. Ferris, eminent Yale anatomist, the clavicular part of the deltoid, the trapezius, omohyoid, levator scapulae, rhomboids, pectoralis major and minor, latissimus dorsi and serratus anterior muscles, the acromioclavicular, conoid and trapezoid ligaments, the subclavian vessels and lymphatic trunks and the lower cervical nerves forming the brachial plexus, the suprascapular vessels and nerve, the transverse cervical vessels and dorsoscapular nerve, fascia and skin are all ruptured and torn away.

This technical, anatomical description involves many structures which would, upon initial consideration, seem to be endowed, as a total of parts, with inherent strength. Actually there is great delicacy, structurally. Rogers has demonstrated that the muscles attaching the scapula to the body are remarkable because of thinness. We have observed that the trapezius is a broad but thin muscle. The rhomboidei and levator muscles are, in sum total, a broad, thin band of muscle tissue. These structures, with the scapular portion of the deltoid and the tendon of the serratus major, compose most of the muscle structures ruptured in scapular avulsion. Rogers further remarks that it is quite clear that there is no other osseous structure of the human body, of the same size and weight as the scapula, whose removal can be accomplished with less injury to the muscles, nerves and vessels and that certainly the loss of no bone as large as the scapula is followed by less disability. Rogers invited attention during an early period of American surgery that death from shock in avulsion of the arm and scapula is unlikely to occur and that hemorrhage is easily avoided. To demonstrate his contention, Rogers collected 11 cases of total avulsion of the arm with scapula attached. Bleeding, shock, serious after effects generally were happily absent. Recovery of the patients whose ages ranged from seven years to middle ages, was rapid in every case. It is particularly interesting to note that this acute observer recorded a case which occurred in 1819, in a subject 16 years old, wherein the boy's arm being caught in machinery was pulled up against the belt wheel and against a beam above, so that for a moment all the machinery in the plant was stopped. Then the arm pulled off with the scapula. Doctor Mussey then instituted experiments in the mill to determine how much power was represented by lifting weights of sufficient strength to stop the machinery. It was found that it required a force of 840 pounds to stop the machinery. The conclusion was that it would require 840 pounds of traction to pull the arm and scapula from the body. This unique study is the only recorded instance of the actual amount of force required to perform an avulsion of the arm and scapula I have been able to reveal in an extensive review of medical literature. There are alleged instances of people being pulled apart by opposing horses. While the strength of one type of horse would vary materially from that of another breed we do have the definition of horse power, viz., the energy required to elevate 33,000 pounds a distance of one foot, in one minute, at sea level.

Gilchrest and Albi in their admirable discussion of lesions of the shoulder, state that the "most frequent mechanism to produce a partial or complete rupture of a muscle or tendon is the sudden application of a stretching force to a muscle which is in the process of vigorous contraction."

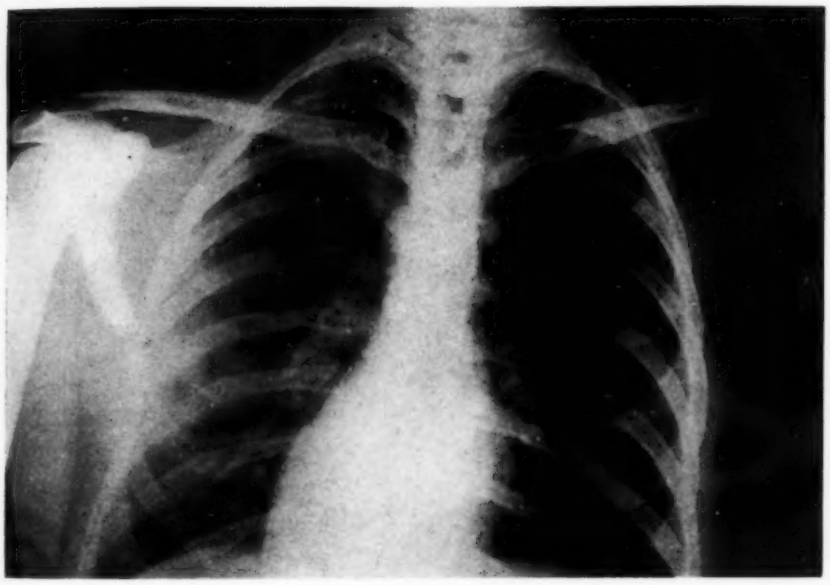
IN THE particular case I am describing it would appear that conditions as nearly ideal for total avulsion as possible existed, namely, abduction a bit beyond right angle. The patient was a person who had engaged in strenuous manual labor all of his life. He was well nourished, athletic and well developed muscularly.

The next factor was the almost instantaneous application of the damaging force. The patient's fingers were caught between the rollers and belt of a large conveyor of gypsum rock, the effect of which was, so to speak, to snatch the arm away with great speed and violence. As the patient was reaching through a grating he was violently impounded against this grating so that the force and violence of the combined impact and pull caused a complete laceration of the right ear against the skull on the upper grating. The lower iron bar comprising the lower grating made a deep transverse imprint on the skin over the region of the third and fourth ribs, both ribs being fractured. The small opening of the grating was inadequate to permit the body being drawn within the machine, there was nothing that could happen except for the weakest link in a pitiful human chain to break. The link that broke was the group of muscles holding the scapula to the body.

CASE REPORT: MR. K. E. J. Age 23. White. Married. Labor foreman.

Admitted December 15, 1938, St. Luke's Hospital, Jacksonville, Florida. Acute emergency. Bleeding freely from a large gaping wound where the right shoulder was missing. He was immediately taken to the operating room, anesthetized, bleeders ligated, then a careful debridement of the whole wound was done with an assistant administering glucose intravenously and the laboratory typing him for transfusion. The latissimus dorsi had ruptured about the middle of the belly. The pectoral muscles had pulled loose at their insertions as well as the trapezius. All muscles had pulled off clean from the clavicle leaving that bone sticking out clean. The distal third to a half of the clavicle was removed and the muscle ends united in a knot in the region of the former articulation. The brachial plexus was hanging loose in four and five inch strands, these were amputated high with a single stroke of a sharp knife and with care not to include these ends in any sutures. Combined gas and T.A. antitoxin 10 cc. given on table. As soon as typing was done and donor secured 500 cc. of blood given by the indirect method in three hours. It is noted the wound had ample skin flaps for approximation so that no grafting was necessary. Dakin's tubes were inserted and left in for five days, continuous

irrigation being maintained. There never was a discharge nor signs of infection nor was there a hemorrhage. Healing was by first intention. The patient was allowed out of bed in seven days, discharged in two weeks. X-ray examination, bedside films after operation, showed no traumatic changes related to the lungs or pleura. Plates showed complete loss of the right scapula and outer third of clavicle with an incomplete fracture of the third and fourth ribs posteriorly. Laboratory data showed him to have a negative urine, two days after injury a 15,000 white count with 68% hemoglobin. Daily smears and cultures for gas and streptococci were negative for five days. His recovery has been rapid, the healing has been complete, there is no postoperative pain, no phantom extremity and at the present time he is back at work. His temperature reached a maximum height of 102.3° on the second day following the accident and declined rapidly to normal on the fourth and remained there thereafter. His blood pressure on admission was 90/60, after the transfusion was 112/80 and remained thereabout until he left the hospital.



Bedside X-ray after Operation
No Internal Injury

Complete Healing
in Two Weeks

A review of the interesting facts of cases recorded in medical literature seems to indicate that the effects of laceration and traction upon the vascular structures is one of preventing hemorrhage by torsion and retraction. The nerve trunks break off and hang in shreds instead of there occurring avulsion of the spinal cord roots such as is seen in Erb's type of upper arm, birth palsy cases. Experiences as related in available medical literature indicate there is greater tendency towards total avulsion when force is applied to the shoulder instead of the arm, irrespective of the position of the latter. It would seem that in cases of abduction beyond a right angle, total avulsion of the arm with the scapula attached is the rule when the victim is not destroyed by being pulled into the machinery.

This case, unique in the annals of present day industrial surgery is presented as a clinical rarity and as one representing material for re-evaluation of the anatomical structures which comprise the shoulder joint, together with a discussion of the modus operandi pertaining to applied violence involving these vulnerable parts of the human body. The treatment of this and allied conditions is very simple. (1) Stop the hemorrhage, if one exists. (2) Treat shock by morphine, glucose in fusions, blood transfusions, etc. (3) If and when conditions permit a careful debridement of the wound. This should be done as soon as possible to prevent spreading of infection. It should be done painstakingly and thoroughly to eliminate every bit of tissue that is not needed. (4) Prophylaxis against gas gangrene and tetanus by appropriate injections of mixed sera. (5) Daily cultures for gas bacilli and streptococci until all danger from this score is over. (6) Rehabilitation—learn to use the other hand. In this particular instance we were fortunate in that he was already left handed and rehabilitation from that standpoint is not necessary. There is no stump here for the use of prosthetic appliances as all intrinsic and inherent worth is forever gone. There is no stump nor muscle groups that can be utilized.

As industrial surgeons it would seem appropriate to invite attention among those who operate machinery, which may thus be potentially dangerous, to advocate further protective measures against one of the saddest of industrial risk hazards.

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Fractures and Dislocations

—*of the Elbow*—

R. H. McDONALD, M.D.,
Newnan, Georgia

FRACTURES and dislocations in the region of the elbow are extremely common, and on account of the toll of deformities and disabilities they have levied in the past have won a reputation for formidableness that's scarcely equalled.*

TYPES OF INJURY: It is important to make an accurate diagnosis of the exact type of fracture or dislocation of the elbow as the methods of treatment are different, and each carries its own particular dangers. Many of the unsatisfactory results that are seen after injuries of the elbow are the result of failure to distinguish between the different types, and the attempt to treat all without distinction by one common method.

EPIPHYSIS: The lower end of the humerus lacks a single common epiphysis similar to that at its upper end or to those at the ends of the radius, femur, and tibia. Instead, ossification proceeds from several distinct epiphyseal centers which unite with the shaft at different age periods. Any of these epiphyses, such as the capitellum or medial epicondyle, may become separated as a result of trauma during the period when it is vulnerable. A knowledge of the normal x-ray appearance of epiphyses, and of the age at which they unite, is essential for proper treatment of fracture.

MULTIPLE INJURIES: Many of the skeletal injuries about the elbow are multiple. This is particularly true of the dislocations which frequently are accompanied by fracture, and of the fractures of the olecranon, upper extremity of the radius, coronoid process, and medial epicondyle, which are often associated with other injuries either fractures or dislocations.

NERVE INJURIES: Injury of one of the main nerves of the arm complicates fractures in about 5% of the cases. Most of these injuries are in the nature of contusions or stretching of the nerve.

Some of the complicating injuries of the elbow fractures are as follows:

Supracondylar — Medial Epicondyle — Lateral Epicondyle—Condylar Fracture—Dislocation of elbow—Head and Neck of Radius—Olecranon—Coronoid (E.W.)—Capitellar Epiphysis—Capitellum.

WE WILL take the suprachondylar fracture as it is the most common of the fractures at the elbow.

All fractures at the elbow must be considered in relation to injury of the soft structures about the elbow. You must consider injury to the vessels and nerves, and the only way to discover this is by examination of the hands. Quite often only the elbow is kept in mind. The important point of whether there has been nerve or circulatory damage done is often overlooked. Many serious and complicating injuries to nerves and vessels are often overlooked, and when that happens—look out for trouble.

By looking at the hand, you can discover, first: Circulation. See if the hand is pallid. Palpate the radial pulse, and if you don't feel the radial pulse, you know the circulation is obstructed, and if this is serious there will be loss of sensation, and loss of motor power. If there is nerve injury, you will find definite evidence of it; if the radial nerve is involved there will be wrist drop, or if not—you will have loss of ability to complete the extension of the fingers. There will be characteristic loss of sensation over certain aspects of thumb and radial half of index finger. If it is the ulnar nerve there will be loss of sensation of the ulnar half of the ring finger and little finger. On medium nerve injury there will be loss of the finer movements of the thumb and the ability to oppose the thumb against the little finger, and there will be a loss of sensation over the end of the second, third, and fourth fingers.

Now to come back to the fractures themselves, and particularly this supracondyle fracture. As you know, it is produced chiefly in children; and you rarely see it in adults, but it may occur. It is almost always the result of a fall on the outstretched hand—the elbow is extended and you get the fracture down through the narrow part of the bone. There is always a narrowing of the bone in that place, and it makes a point of weakness

* Presented at the Nineteenth Annual Meeting of the Surgical Association of the Atlanta and West Point Rail Road Company, the Western Railway of Alabama, and Georgia Railroad, Atlanta, March 21, 1939.

where the fracture occurs, and the level of the fracture may vary somewhat. The displacement is always of the characteristic type, with the distal fragment backward, and there is a certain amount of overriding of the fragments.

The matter of reduction is important. (The fracture is produced, as I said by a fall on the outstretched hand.) It is a known principle to repeat the steps by which the injury and displacement were caused, only, of course, in the reverse order; therefore, have the arm in extention. You also want traction on the elbow. You need an assistant pulling on the arm. (It doesn't take trained help.) Place your hands on the front of the arm with both thumbs pressing on the lower end of the upper fragment, and with fingers reaching around posteriorally to grasp the lower fragment and olecranon. Press as hard as you can with the thumbs on the end of the fragment and lever the lower fragment forward—then, holding it, gradually bring the arm up into acute flexion. When you have completed that the next step is to feel the pulse, and if it is good, in all probability you have got the fracture reduced, because if it is out of place flexing the elbow will also obstruct the radial pulse.

You may use a fluoroscope if you wish, but I prefer pictures made of the break. A lateral view will show it.

Then proceed to dress the elbow—put a little fold of thin cotton in the bend of the elbow and bandage the arm in the position of acute flexion. But supposing when you flex the elbow you find the radial pulse is stopped, which is apt to be the case if there is much swelling of the elbow—that would be because you are seeing the case late. If you are seeing it early there won't be much swelling, and you can then reduce the fracture easily. Of course, if you see it late, you may reduce the fracture, but it is hard to maintain it, because you do not dare to put it up in the acute position. You will find the circulation is obstructed, so you have to content yourself with a less favorable position. You can't get flexion, and then you will have to put on a posterior plaster shell in order to maintain that position of flexion. Now you should check the radial pulse at intervals for the first 24 hours, and keep in close contact with the patient for a few days thereafter.

Valkman's ischemia is a complication which indicates immediate surgical intervention. The only procedure you can carry out is to expose the region of the fracture and the artery, and see its condition.

If the artery should be beyond repair, interrupted, or thrombosed, you cannot do anything, but, at least, you can remove the blood clot, and put in a drain for 24 to 48 hours, and that of itself will favor the establishment of a collateral circulation which we ought to get in most cases if the soft parts are not boggy with edema or extravasated blood.

The more special and complicated problems you probably won't handle, but the supracondylar fracture is one you can't avoid.

Fourth Silicosis Symposium

THE FOURTH SILICOSIS SYMPOSIUM to be held June 19 to 23, 1939, at the Saranac Laboratory, Saranac Lake, New York, will this year present an unusual type of program.

The first day will be used primarily to summarize the subjects which have previously been discussed in former symposia. The remainder of the week of the symposium will be devoted to special subjects, giving the results of surveys and clinical experiences in different types of industries; considering the average industrial worker and his reaction to inert dusts; the reaction to mixed dusts; and the various aspects of administration including prevention, environmental control, insurance carrier, and legislation.

Registration will be limited to 100, and the tuition for this course is $25.00. Application should be made to the Secretary of Trudeau School, P.O. Box 131, Saranac Lake, New York. The program follows:

Monday Morning, June 19:
Introduction: DR. L. U. GARDNER, Saranac Laboratory.
Summaries with Discussion:
"Etiology," D. E. CUMMINGS, Saranac Laboratory.
"Dust Counting and Analysis," PROF. P. DRINKER, Harvard University.
"Pathologic Anatomy," DR. L. U. GARDNER, Saranac Laboratory.

Monday Afternoon:
"Pathologic Physiology," DR. W. S. MCCANN, University of Rochester.
"Clinical Picture," DR. A. R. RIDDELL, Ontario Dept. of Health.
"Roentgenology," DR. E. P. PENDERGRASS, University of Pennsylvania.

Tuesday Morning, June 20:
"Disability, Its Causes and Clinical Evaluation," DR. W. S. MCCANN.
Average Industrial Worker:
"The Industrial Clinic and Its Functions," DR. A. G. KAMMER, Medical Director, Inland Steel Company.
"Incidental Pathological Findings," DR. A. J. VORWALD, Saranac Laboratory.
Reaction to Inert Dusts:
"Typical Pathologic Picture of Linear Exaggeration," DR. L. U. GARDNER.
"Roentgenologic Appearances in Linear Exaggeration," DR. H. L. SAMPSON, Trudeau Sanatorium.

Tuesday Afternoon:
Results of Surveys:
Mining in Dolomite:
"Atmospheric Conditions," PROF. PHILIP DRINKER.
"Clinical Picture and X-ray Findings," DR. H. M. ROEBER, Bonne Terre, Missouri.
Gypsum Industry:
"Atmospheric Conditions," T. M. DURKAN, Saranac Laboratory.
"Clinical Picture and X-ray Findings," DR. D. M. BRUMFIEL, Saranac Lake, New York.
Cement Industry:
"Atmospheric Conditions," T. M. DURKAN.
"Clinical Picture and X-ray Findings," DR. D. M. BRUMFIEL and DR. H. L. SAMPSON.

Wednesday Morning, June 21:
Classical Silicosis:
Picher — Previous to 1932:
"Atmospheric Conditions," D. E. CUMMINGS.
"Clinical Picture," DR. A. J. LANZA, Metropolitan Life Insurance Company.
"X-ray Findings," DR. R. R. SAYERS, U. S. Public Health Service.

"Pathology," DR. L. U. GARDNER.
"Mortality," D. E. CUMMINGS.

Wednesday Afternoon:
"Clinical and Roentgenologic Survey in Individuals Working in a Pure Silica Industry," DR. E. P. PENDERGRASS.
Rapidly Developing Silicosis:
Sandblasters:
"Clinical, X-ray and Pathological Findings," DR. H. L. SAMPSON and DR. L. U. GARDNER.

Thursday Morning, June 22:
Reaction to Mixed Dusts:
Cement Industry—Raw Mills:
"Atmospheric Conditions, X-ray Findings," DR. L. U. GARDNER.
Gold Mining:
"Ontario Gold Mining—Variations with Content of Free Silica and Individual Mine Dusts," DR. A. R. RIDDELL.
Iron Ore Mining:
"Atmospheric Conditions," D. E. CUMMINGS.
"Clinical Picture and X-ray Findings," DR. L. E. HAMLIN, Pennsylvania Mining Company, Norway, Michigan.
Discussion: DR. H. F. RINGO, Montreal Mining Company, Montreal, Wisconsin and DR. D. C. PIERPONT, Newport Hospital, Ironwood, Michigan.

Thursday Afternoon:
Foundry Industry:
"Atmospheric Conditions," T. HATCH, New York State Department of Labor.
"Clinical Picture and X-ray Findings," DR. O. A. SANDER, Milwaukee, Wisconsin.
Hard Coal Mining:
"Atmospheric and Clinical Findings," DR. R. R. SAYERS.

Friday Morning, June 23:
"Administration of Program of Prevention," DR. C. D. SELBY, Medical Director, General Motors Corporation.
"Environmental Control in Program of Prevention," D. E. CUMMINGS.
"An Employer's Viewpoint," A. FLETCHER, St. Joseph Lead Company.

Friday Afternoon:
"Functions of the State in Control," M. BOWDITCH, Massachusetts Dept. of Labor and Industries.
"The Insurance Carrier," DR. A. J. LANZA.
"Legislation: Formulation," T. C. WATERS, Occupational Disease Commission.
"Legislation: Administration," V. WRABETZ, Chairman, Wisconsin State Industrial Commission.

Traumatic Pes Cavus

A. GOTTLIEB, M.D.,
Los Angeles, California

THE misnomer "idiopathic" pes cavus is all too frequently applied to the high arched foot, whenever the etiology is not easily determinable. As an idiopathic entity this form of foot malformation does not exist. The excessively high arched foot, unless it is congenital, should be classed among the talipes of neurological origin or be diagnosed as a pes cavus, secondary to trauma.

The acquired cavus foot is the result of disturbed balance between the short foot muscles, viz., the interossei and lumbricalis, and the long calf muscles, i.e., the triceps surae.

According to H. Debrunner[1] a pes cavus develops whenever the intrinsic muscles are continuously over-active and the calf muscles, the antagonists, sustainingly hypotonic. The hypotonus of the triceps surae muscles may be caused either by a defective innervation, centrally or peripherally originated, or by inhibited action, voluntarely or reflexly produced. Being insufficient in strength, the calf muscles cannot counteract the power of the healthy foot muscles. Lastingly unopposed in action, these intrinsic foot muscles become hypertonic, spastic, and shortened, eventually. The shortening of these muscles approximate the fore- and the rear parts of the foot by flexing it in the mid-tarsal articulations. The longitudinal arch is thus heightened; an acquired pes cavus is thus produced, in virtue of the imbalance between the antagonistic sets of muscles: the intrinsic of the foot and the posterior muscles of the leg.

Hypotonus of the calf muscles may result whenever the foot has sustained trauma. The injury need not be grave. Contusion or compression of the foot; spraining of the ankle; fracture of the first metatarsal bone or the basal phalanx of the big toe are liable to provoke inactivity of the triceps surae muscles.

The mechanism of production of the deformity is as follows: After the injury the patient adopts a gait which safeguards the painful region from weight bearing. It is a cautious mode of walking and consists in: (1) placing the heel and lateral border of the foot simultaneously on the ground; (2) making short steps so that the injured foot does not require bending of the ankle, and (3) resting the painful foot on the ground but the shortest period of time. This manner of walking produces a functional imbalance between the muscles of the calf and foot. The function of the calf muscles is inhibited, those of the foot augmented. This leads eventually to a permanent hypotonus of the triceps muscles and to hypertonus, later to contracture, of the short muscles of the foot.

Besides the muscle disturbance, the postion of the foot on the ground, i.e., heel and lateral border, favors flexion in the Chopard joint. The metatarsus drops downwards and effects a heightening of the longitudinal arch.

SYMPTOMATOLOGY: The deformity may remain overlooked for some time and be noticed only by a shoe salesman, while fitting shoes. A discrepancy in the length of the two feet and the height of the arches may be disclosed. The patient may not complain of pain at all or only of aching after prolonged standing or walking, because of stretching of the contracted plantar tissues. If pain is present, it is localized in the area of the joint between the inner cuneiform and scaphoid. Tenderness may here be elicited and swelling noticed, at times. Tenderness may also be induced in the plantar surface, whenever the plantar aponeurosis and intrinsic muscles are stretched. The skin on the outer border of the foot and under the metatarsal heads may be callused. Pain and tenderness may be present on the lateral border and below the external malleolus if the heel is in extreme varus and the external lateral ligament of the ankle is pulled upon.

EXAMINATION: The characteristic form of the foot is apparent: the fore part is pronated, flexed and adducted; the metatarsal arch flattened; the

1. H. DEBRUNNER: *Ztschr. f. Orthop. Chir.*, 45: 114, 1924.

heel supinated. The deformity is principally in the fore foot. A dropping in the Chopard articulation has occurred and the plantar tissues have shrunk. The flattened transverse arch can be corrected by pressure from below; the clawed-toes straighten out thereby. A claw-toe deformity always exists. The toes are extended in the metatarso-phalangeal and flexed in the interphalangeal joints. The toe extensors are more or less contracted. The plantar muscles are more fleshy than normally and the plantar aponeurosis is palpable like a bow-string. The heel is always in varus position; the tendon Achilles is sometimes shortened and dorsiflexion of the foot limited.

The foot tracing shows a heightened longitudinal arch and a flattened transverse. The lateral view of the x-ray presents characteristic features: a high arch with the apex at the tarsal scaphoid bone; a slight gaping on the dorsal surface of the joint between the scaphoid and cuneiform bones; a vertically placed and plantarily inclined first metatarsal bone; the clawed position of the toes.

TREATMENT: The mode of production of this deformity, after a mild foot injury, dictates the need and the manner of prevention during the acute stage. Against the cautious gait, measures must be taken. Walking should be interdicted or not be permitted without protection to the injured foot. No weight bearing should be allowed; but, if tolerated, the foot should be immobilized in a cast and held in its anatomically correct form and position. After acute pain has subsided, the cast may be made removable and the foot submitted to physiotherapy.

An existing pes cavus is treated non-operatively, as a rule. An adequate support is provided and a correct shoe fitted. The support is a corrective device and reverses the relative malposition of the fore to the rear part of the foot. The supinated heel must be pronated; the pronated metatarsus supinated. It also must relieve the weight from the metatarsal heads. The support is made on a plaster mould which is obtained from a cast of the foot while it is held in the corrected position. While the plaster hardens, the foot is shaped so that the heel is pronated and the fore foot supinated—just the opposite of what is done when dealing with a flat foot deformity.

The shrunken plantar tissues, the contracted tendons and joints, the shortened tendon Achilles should all be stretched daily. Painstaking and patient endeavor will effect a lengthening of these tissues. The foot is manipulated in a manner to correct the relative malposition of its parts. Massage follows the manipulations.

If conservative attempts fail after about three months, it becomes necessary to resort to forcible manipulation under anesthesia and to casting after correction is obtained. Operative lengthening of tendons and Steindler's operation may have to be added. Flexed phalangeal joints may have to be straightened by a wedge-shaped resection and arthrodesis.

However, it is surprising how frequently all the symptoms of even a severe form of pes cavus may be overcome by conservative measures, although it is tedious and time consuming. The most logically appointed operation may be of less benefit than correction obtained by physical and mechanical therapy.

SUMMARY: The term "idiopathic" pes cavus is frequently misapplied for conditions which are merely secondary to mild foot injuries. The mode of production of this deformity is discussed, and the symptoms and signs of the malformation are presented. The treatment is preventive, and the correction principally conservative.

Southern Railway Surgeons

DR. WILLIAM H. FRAMPTON, President of the Association of Surgeons of the Southern Railway System, advises that the 1939 Convention of that Association will be held at the New Willard Hotel, Washington, D. C., June 13, 14, and 15. The Southern Railway's Chief Surgeon, DR. GLENN I. JONES, and the District of Columbia members of the Association will be convention hosts. The Program Committee is preparing an unusually interesting program, having in mind to present a symposium on traumatic surgery, another on the socialization of medicine, a third on the railroad retirement problem, and a fourth on scientific subjects. The Arrangements Committee includes DR. A. R. SHANDS (Chairman), DR. L. S. GREENE, DR. J. F. MITCHELL, DR. W. B. MASON, DR. H. A. FOWLER, and DR. J. H. LYONS, all of Washington; and the Program Committee includes DR. F. WEBB GRIFFITH, Asheville, N. C. (Chairman), DR. T. B. REEVES, Greenville, S. C., and DR. B. S. LESTER, Birmingham, Ala. The complete program will appear in INDUSTRIAL MEDICINE for June.

New Books

Review by

WM. D. MCNALLY, A.B., M.D.

A TEXTBOOK OF BIOCHEMISTRY, by ROGER J. WILLIAMS, PH.D., D.Sc. Published by D. Van Nostrand Company, New York.

DR. WILLIAMS has written a book of 525 pages containing 23 chapters, with a glossary of physiological and medical terms. The book is divided into five parts. The first three sections deal with biochemical materials, tissue composition, and food composition. The author takes up carbohydrates, proteins, and miscellaneous constituents. Under this latter heading there is described a group of simple organic compounds, which are common, but usually not abundant, food or tissue constituents. Under the composition of body tissues, however, the author has failed to mention the presence of silica, with the exception that "it is found as one of the trace elements, which may be present accidentally and without function." This reviewer disagrees with the author on this point because silica is found in water and all foods, and consequently is a constituent of all body tissues.

Chapter XIII is a brief but good summary of the endocrine control. The concluding chapter is on chemotherapy, showing the inter-action between the drug and the organ and tissue affected.

This is an excellent book for the industrial physicians and surgeons, as it presents an opportunity to review as well as add to their knowledge of biochemistry.

American Association of Industrial Physicians and Surgeons Twenty-Fourth Annual Meeting : with The American Conference on Occupational Diseases and Industrial Hygiene

FOLLOWING is the Tentative Program of the Twenty-Fourth Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS with the AMERICAN CONFERENCE ON OCCUPATIONAL DISEASES AND INDUSTRIAL HYGIENE, Hotel Statler, Cleveland, Ohio, June 5, 6, 7, and 8, 1939:

MONDAY MORNING
June 5, 1939

8:00-9:30 Registration.

W. P. YANT and C. D. SELBY,
Chairmen of the Session

9:30 Opening of AMERICAN CONFERENCE ON OCCUPATIONAL DISEASES AND INDUSTRIAL HYGIENE and 24th Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS.

Address of Welcome: HON. HAROLD H. BURTON, Mayor, City of Cleveland.

Response for the Association: C. D. SELBY, M.D., President, American Association of Industrial Physicians and Surgeons.

10:00 "Health of Workers," R. R. SAYERS, M.D., Chief, Division of Industrial Hygiene, U. S. Public Health Service, Washington, D.C.

10:30-11:00 INTERMISSION: Inspection of Scientific and Commercial Exhibits.

11:00 "Physiologic Effects of Hot Atmospheres," F. C. HOUGHTON, Director of Research Laboratory, American Society of Heating and Ventilating Engineers.

12:00-2:00 LUNCHEON.

MONDAY AFTERNOON

2:00 "The Public Health Aspects of Occupational Hygiene," HENRY F. VAUGHAN, DR.P.H., Director, Public Health Commissioner, Detroit Department of Health.

2:30-3:00 INTERMISSION: Inspection of Scientific and Commercial Exhibits.

3:00 "Fatigue in Industry," D. B. DILL, Harvard Fatigue Laboratory. (Lantern Slide and Motion Picture Demonstration.)

MONDAY EVENING

6:30 DINNER: Guest Speaker, WHITING WILLIAMS, Analyst of Public Opinion, Cleveland, Ohio, who will speak on "The Public Significance of Industrial Health Programs."

TUESDAY MORNING
June 6, 1939

WARREN A. COOK
Chairman of the Session

8:30-8:45 "Use of Interferometer for Two Component Mixtures," G. C. HARROLD and L. E. GORDON, Industrial Hygiene Laboratories, Chrysler Corporation.

8:50-9:05 "Modern Dust Control in Underground Mines," D. E. CUMMINGS, Director of Field Activities, Saranac Laboratories.

9:10-9:30 "Evaluation of Benzol Exposure," H. B. ELKINS, Chief Chemist, Bureau of Occupational Hygiene, Massachusetts Dept. of Labor and Industry.

9:35-9:55 "Study of Motion Picture Industry in Detroit," W. G. FREDRICK, Bureau of Industrial Hygiene, Detroit Department of Health.

10:00-10:20 "A Study of Silicosis in the Silica Brick Industry," W. B. FULTON and A. E. DOOLEY, Bureau of Industrial Hygiene, Pennsylvania Department of Health.

10:25-10:40 "Apparatus and Procedure for Vapor Toxicity Studies," D. D. IRISH, Biochemical Laboratory, Dow Chemical Company.

10:45-11:00 "Possibilities of Control of Lead Exposure by Examining less-than-24-hour Lead in Urine Samples," E. C. BARNES, Industrial Engineer, Medical Department, Westinghouse Electric and Mfg. Company.

11:05-11:25 "Exposure to Fluorine in Industry," W. F. MACHLE, Kettering Laboratory of Applied Physiology, University of Cincinnati.

11:30-11:50 "Lead Absorption versus Lead Poisoning," R. A. KEHOE, Kettering Laboratory of Applied Physiology, University of Cincinnati.

11:55-12:05 "Toxicity Studies on Some Cadmium Compounds," H. T. WALWORTH, Bureau of Industrial Hygiene, Detroit Dept. of Health.

12:05-1:30 LUNCHEON.

TUESDAY AFTERNOON

W. P. YANT,
Chairman of the Session

1:30-1:50 "Toxicity of Benzols," H. H. SCHRENCK, Chief Chemist, Health Division, U. S. Bureau of Mines.

1:55-2:20 "Vapor Tension Method for the Determination of Solvents in Air," L. SILVERMAN and G. REESE, Department of Industrial Hygiene, Harvard School of Public Health.

2:25-2:45 "A New Method of Counting Impinger Samples," C. R. Williams, Petrographic Engineer, Liberty Mutual Insurance Company.

2:50-3:10 "Calibration and Use of the Gas Interferometer," F. A. Patty, Director of Industrial Hygiene, Fidelity & Casualty Company of New York.

3:15-3:30 "Air Sampling of Asbestos Dust—Comparison of Impinger and Electrostatic Precipitator Methods," J. W. Fehnel, Industrial Hygiene Laboratory, Metropolitan Life Insurance Company.

3:30-4:00 Intermission: Inspection of scientific and commercial exhibits.

4:00 Organization meeting of the American Conference on Occupational Diseases and Industrial Hygiene.

TUESDAY EVENING

6:30 Nela Park—Buffet Dinner
Demonstration of lighting research facilities of the General Electric Lighting Institute. "Visibility and Comfort in Seeing," M. Luckeish and F. Moss, General Electric Company, Cleveland.

WEDNESDAY MORNING

June 7, 1939

G. F. Sykes, M.D.,
Medical Director,
White Motor Company, Cleveland,
Chairman of the Session

9:00 Opening of the Twenty-fourth Annual Meeting of the American Association of Industrial Physicians and Surgeons.

9:30 "The Maintenance of Mental Health in Industry," F. J. Roethlisberger, Graduate School of Business Administration, Harvard University, Boston, Massachusetts.

10:00 Discussion.

10:15 "Fatigue and Employment," R. R. Jones, M.D., U. S. Public Health Service, Washington, D.C.

10:45 Discussion.

11:00 Intermission: Inspection of scientific and commercial exhibits.

11:20 "Plastic Surgery in Relation to Industrial Injuries," Donald Glover, M.D., Associate Clinical Professor of Surgery, Western Reserve University Medical School Director of Surgery, St. Luke's Hospital, Cleveland.

11:50 Discussion. 12:05 Luncheon.

WEDNESDAY AFTERNOON

H. L. Davis, M.D.,
Chairman of the Session

1:30 "The Problem of Medical Service for the Small Industrial Plant," M. N. Newquist, M.D., Assistant Director, American College of Surgeons, Chicago; Medical Director, The Texas Company, New York City.

2:00 Discussion.

2:20 "The Relationship of the Industrial Medical Department to other Personnel Activities," H. W. Lawrence, M.D., Personnel Director, Fisher Body Cleveland Division, General Motors Corporation.

2:50 Discussion.

3:10 Intermission: Inspection of scientific and commercial exhibits.

3:30 "Geriatrics in Relation to Employment," W. A. Sawyer, M.D., Medical Director, Eastman Kodak Company, Rochester, New York.

4:00 Discussion.

WEDNESDAY EVENING

6:30 Annual Banquet. Toastmaster: C. D. Selby, M.D., President, American Association of Industrial Physicians and Surgeons. Guest Speaker: William S. Knudsen, President, General Motors Corporation, Detroit, who will speak on "Human Relations in Industry," after which he will present the Knudsen Award for the most outstanding contribution to Industrial Medicine, 1938-39.

THURSDAY MORNING

June 8, 1939

R. C. Engel, M.D.,
Medical Director,
Cleveland Division, Republic Steel Corporation,
Chairman of the Session

9:00 "The Repair of Tendon and Nerve Injuries," Sumner L. Koch, M.D., Chicago, Illinois.

9:30 Discussion.

9:50 "Making the World Supraspinatus Conscious," E. A. Codman, M.D., Consulting Surgeon, Massachusetts General Hospital, Boston.

10:20 Discussion.

10:40 Intermission: Inspection of scientific and commercial exhibits.

11:00 "Treatment of Hernia," David H. M. Gillespie, M.D., Associate Surgeon, General Surgical Service, Hospital for Ruptured and Crippled; Surgeon, New York Central, and New York, New Haven & Hartford Railroads, New York City.

11:30 Discussion.

11:50 Luncheon with Rotary Club. Guest Speaker Loyal A. Shoudy, M.D., Medical Director, Bethlehem Steel Corporation, who will talk on "The Doctor Goes to Work in Industry."

THURSDAY AFTERNOON

H. W. Lawrence, M.D.,
Chairman of the Session

1:30 "Operative Problems in Rehabilitation of the Injured," Henry H. Kessler, M.D., Ph.D., Medical Director of the New Jersey Rehabilitation Commission, Newark.

2:00 Discussion.

2:20 "Physiotherapy Problems in Rehabilitation of the Injured," John S. Coulter, M.D., As-

sociate Professor and in charge of Physical Therapy Departments at Northwestern University Medical School, Passavant, Illinois Central and St. Luke's Hospitals, Chicago.

2:50 Discussion.

3:10 "The Relation of Trauma to Disease and Its Compensability," SIDNEY MCCURDY, M.D., Supervisor Medical Section, The Industrial Commission of Ohio, Columbus.

3:40 Discussion.

Constitution and By-Laws

FOLLOWING are the Constitution and By-Laws of THE AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, containing — *in italics* — certain proposed Amendments which are to be presented for action thereon by the Board of Directors and the Members at the Twenty-Fourth Annual Meeting of the Association, at Cleveland, Ohio, June 7 and 8, 1939:

Adopted May 10, 1929

Article I — Name

The name and title of this organization shall be THE AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS.

Article II — Object

The object of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in industries; to promote a more general understanding of the purposes and results of the medical care of employees and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for their mutual advancement in the practice of their profession.

Article III — Membership

Section 1.—Membership in this Association shall be of four classes: (a) Active, (b) Associate, (c) Honorary, and (d) Fellow. Only physicians who are actively engaged in the practice of industrial medicine and surgery or who are engaged in the investigation of industrial medical problems shall be eligible to Active Membership; other physicians shall be eligible to Associate Membership. Any person who has contributed distinguished service to the objects for which the Association stands shall be eligible to Honorary Membership.

Section 2.—Associate and Honorary members shall have all the privileges of Active Members, except the privileges of holding office and voting for officers and directors or for amendments to the Constitution and By-Laws.

Section 3.—Applications for Active or Associate Membership must be made in writing to the Secretary-Treasurer; be accompanied by the fee for the annual dues; approved by an Active Member in good standing and be certified by the Secretary of applicant's local county medical society that he is ethical and in good standing in his local county medical society. Applications shall not be acted upon by the Board of Directors unless they have first been approved by a Membership Committee of three, to be appointed by the President. *Honorary Membership may be conferred upon physicians who have made some definite contribution towards the advancement of Industrial Medicine and Surgery or who have performed some special service for the Association.* Proposals for Honorary Membership shall be made to the Secretary-Treasurer in writing for consideration by the Board of Directors.

Section 4.—A two-thirds vote of the Board of Directors shall be required to elect to any class of membership.

Article IV — Fellowship

Section 1.—Active members after *three* years of membership *in the* Association may apply for Fellowship.

Section 2.—Fellowship shall be conferred by the Board of Directors upon those applicants who satisfactorily and successfully pass an examination by the Board of Examiners.

Section *3.*—A suitable certificate will be issued by the Secretary to those upon whom Fellowship has been conferred.

Article V — Officers and Directors

Section 1.—The officers of this Association shall be a President, a President-Elect, a First Vice-President, a Second Vice-President, and a Secretary-Treasurer. They shall be Fellows of the Association and shall be elected by the Association and shall serve from the close of the next Annual Meeting or until their successors are elected and installed.

Section 2.—An Executive Secretary shall be appointed by the Board of Directors. He can be either a physician or layman and shall hold his office from year to year at the pleasure of the Board of Directors.

Section *3.*—The affairs of the Association shall be administered by a Board of Directors, consisting of the officers and *ten* additional directors. *Presidents of component societies shall be ex-officio members of the Board of Directors with the same powers as other directors.* Only active members and fellows shall be eligible to serve on the Board of Directors.

Section 4.—The planning of the work of the Association, arrangements for meetings and program and for other matters pertaining to the administration of its affairs, shall be vested in the Board of Directors, except as otherwise herein expressly provided. The President of the Association shall serve as Chairman of the Board. The Board shall make its own rules, and *it and the President* shall appoint such committees for carrying out the work as *they* shall deem necessary and advisable.

Section 5.—Executive Committee:—The five officers of the Association shall constitute an Executive Committee.

Section 6.—The Board of Examiners shall be incorporated under the laws of the State of ..... and shall be appointed by the Board of Directors. Their tenure of office shall be subject to the pleasure of the Board of Directors.

Article VI — District Branches or Councils

Section 1.—The Board of Directors shall have the power to take the necessary steps for organizing local district Branches or Councils of the Association.

Section 2.—A local organization of Industrial Physicians and Surgeons already established and consisting of not less than twenty-five members may *become a component society and its members admitted to full active membership of* this Association by making application therefor with a certification from their President and Secretary that their members meet all our requirements for membership; have been carefully chosen and are all members in good standing of their local county medical society. *Dues per member for current fiscal year and a copy of Constitution and By-Laws must accompany application.*

Section 3.—Any local or national organization of laymen or of another profession whose work and activities are closely allied to Industrial Medicine may become an affiliated society and its members admitted to Associate membership in this Association by making application therefor accompanied by a roster of its officers and members, a copy of its Constitution and By-Laws, and dues per member for current fiscal year.

Article VII — Amendments

This Constitution may be amended by a three-fourths vote of the members present and voting at any annual meeting of the Association provided, that notice of proposed amendments must be given by publication in the official *publication* of the Association at least *thirty* days before the date set for the meeting.

BY-LAWS

Article I — Meetings

Section 1.—The Annual Meeting of the Association shall be held at the *time and* place *selected by the Board of Directors. Fifty* members *and Fellows* shall constitute a quorum.

Section 2.—Special meetings may be called by the President with the approval of five members of the Board of Directors.

Section 3.—Notice of all meetings shall be sent to the members by the Secretary-Treasurer at least thirty days in advance of the date set for them.

Section 4.—Each member of the Board of Directors shall be notified in writing by the Secretary-Treasurer at least two weeks in advance, as to the time, place and purpose of a meeting of the Board of Directors. *Nine* Directors shall constitute a quorum.

Article II — Dues

Section 1.—The annual dues of active and associate members shall be Five Dollars per year and of Fellows shall be Ten Dollars per year. *Dues of members of component and affiliated societies shall be One Dollar per year per member. Dues* shall be payable in advance on the first day of January of each year. Honorary members shall pay no dues.

Section 2.—Any member whose dues are unpaid is not in good standing, and he shall have no vote until his indebtedness is discharged. When the dues of any member shall not be paid during the fiscal year his membership shall automatically cease.

Section 3.—Any member dropped for non-payment of dues may be reinstated at any time previous to the convening of the Annual Meeting of the year following his delinquency by payment of dues in arrears and also the dues for the current year.

Article III — Election of Officers and Directors

Section 1.—Nominations for officers and directors shall be made by a nominating committee of three active members to be appointed by the President at the first executive session of any Annual Meeting. Provided, this article shall not be construed so as to deprive any member of his right to make nominations from the floor.

Section 2.—Election of officers and directors shall take place at the last executive session of the Annual Meeting.

Section 3.—At each Annual Meeting there shall be elected to the Board of Directors *four* members to serve for a term of two years. Upon expiration of the term of office of the President he shall become automatically a member of the Board of Directors to serve for two years.

Section 4.—In the event of there being competitive nominations for any office, election shall be by ballot, and a majority of all votes cast shall be required to elect. If after two ballots there shall be no election, all but the two candidates receiving the highest number of votes shall be dropped from the ballot and the voting confined to the two so designated.

Section 5.—The Board of Directors shall have power to fill vacancies among the officers and directors to serve until the next Annual Meeting of the Association or until their successors are elected and installed.

Article IV — Duties of Officers

Section 1.—The President shall preside at all meetings of the Association and of the Board of Directors and shall perform such other duties as may be directed by the Board of Directors. He shall also be ex-officio member of all committees. In the absence of the President, *the President-Elect or a Vice-President* shall act in his place.

Section 2.—The Secretary-Treasurer *shall be the custodian of all monies of the Association* and shall pay all just bills against the Association subject to the approval of the Board of Directors; he shall submit his accounts for audit at the Annual Meeting and shall transmit to his successor in office all funds and property of the Association remaining in his possession. He shall submit an annual report to the Association in such form as may be determined by the Board of Directors. He shall be bonded in such an amount as shall be determined by the Board of Directors from year to year and in a company approved by the Board of Directors. Expense of bond shall be borne by the Association.

Section 3.—The Executive Secretary shall keep an accurate record of all the transactions of all meetings of the Association and of the Board of Directors; shall carry on the correspondence of the Association; shall keep an accurate list of the members; shall receive all monies belonging to the Association, giving receipt therefor, and turning it over to the custody of the Secretary-Treasurer. He shall be under the direct supervision of the Secretary-Treasurer to whom he shall make all reports. He shall be paid a yearly salary, the amount to be determined by the Board of Directors.

Section 4.—The Executive Committee shall transact the duties of the Board of Directors in emergencies or in any special assignment from the Board of Directors. It shall pass upon the applications of component and affiliated societies and complete arrangements for their admission into the Association. Its actions shall be subject to the approval of the Board of Directors.

Section 5.—The Board of Examiners shall hold their regular meetings, at least once a year, for the purpose of examining applicants for Fellowship and shall certify the results of the examinations to the Board of Directors.

Article V — Committees

Section 1.—The President shall appoint a program committee consisting of two active members and the Secretary-Treasurer as a member ex-officio whose duty it shall be to provide the program for each meeting of the Association.

Section 2.—The President shall appoint other committees as the Association or Board of Directors may recommend or at his own discretion for any special purpose pertaining to the Association or its activities.

Section 3.—The President shall appoint a membership committee of three members, whose duty it shall be to investigate and pass upon all applications for membership before they are referred to the Board of Directors for their consideration.

Article VI

Section 1.—All resolutions shall be referred to appropriate committees for recommendation before submitting them to the Association.

Section 2.—A member may be expelled for such cause as the Board of Directors may deem sufficient; provided, that a copy of the charge made against him shall be furnished to him in writing at least thirty days before the meeting at which such action is taken. A three-fourths vote of all members of the Board of Directors shall be required to expel a member of the Association.

Article VII — Amendments

Section 1.—These By-Laws may be amended by a majority vote of the members present and voting at any Annual Meeting of the Association; provided, that notice of proposed amendments must be given by publication in the official *publication* of the Association at least thirty days before the date set for the meeting.

Industrial Medicine

Reg. U. S. Pat. Off.

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VOLUME 8 MAY, 1939 NUMBER 5

He Will Be Missed

DR. ALLEN D. LAZENBY, Medical Director, and one of the Vice-Presidents, of the Maryland Casualty Company, authority on problems of health and occupational diseases, and a member of the Council on Industrial Health of the American Medical Association, died on Tuesday, April 18. DR. LAZENBY was among the best known and most widely liked and respected of the medical men who are making careers of industrial medicine. The high points of his experience are as follows:* ". . . b. Baltimore, Md., Sept. 9, 1893; M.D., Univ. of Maryland Sch. of Med. & Coll. of Phys. & Surgs., 1912-16; intern., St. Agnes Hosp. Baltimore, 1916-17; U. S. Army Med. Sch., 1917-18; post-grad., orthopedic surg., 1918; Silicosis Symposium, Saranac Laboratory, 1934, '35. Army: Captain, U. S. Med. Corps, 1917-20, M., Grace McGowan, 1917. Indust. affil., Maryland Casualty Co., since 1921, as Chief Surgeon, f.t., in charge of Medical Dept. for 900 employees. Fellow: A.C.S. (member, Com. on Industrial Medicine and Traumatic Surgery); A.M.A.; Am. Assoc. Indust. Phys. & Surg.; member: Med. & Chirurgical Faculty of Maryland; Baltimore City Med. Soc. Author of numerous medical articles." DR. LAZENBY was distinguished for his outstanding work in connection with "the administration of the medical and surgical aspects of insurance coverage as they relate to personal injury claims, especially occupational disease problems and the medical aspects of accident prevention." He was a member of the Medical Committee of the New York World's Fair. A man of wide acquaintance with the problems as well as the men of industrial medicine, a clear vision, a gift of expression which was inherently forceful and always clear, and a pleasing and likable personality, he was needed, and he will be missed!

* WHO'S WHO IN INDUSTRIAL MEDICINE AND TRAUMATIC SURGERY.

Common Sense

WE LIFTED out from DR. ROBERTS' article (page 215) the next to last paragraph, preferring to use it here—where, in its inspiration to constructive thought in these times of disturbance, it is an editorial in, of, and by itself:

"The job of industrial medicine in this day of changing concepts is to hold a safe and common sense course between the inefficiency of extreme individualism on the one side and the tyranny of regimented medicine on the other."

No relation is static; change is the rule of all life, and all progress; and the most satisfactory reaction, when a reaction is indicated, is, without question, the "common sense course." There *is* such a course in every development; and it *can* be found, and held. Among the revisions that seem to loom inevitable in certain phases of medical expression, and between the violences of opinions that are pressing toward extremes, the "common sense course" is vitally necessary. So far as the physician in industry is concerned, he appears to us to have not only the job, but also the duty, of holding that course. The reason is that he, more than all others, has both the position and the opportunity to do it as it should be done. In addition to his higher-than-ordinary professional qualifications, he possesses also the *sine qua non* of responsible industrial affiliation, namely, the balanced combination of abilities which enables him to weigh and evaluate in terms of sound mental processes the intricate and involved elements of the human equation with which, more intimately than any one else, he is in daily contact. Agreeing with DR. ROBERTS, therefore, we make bold to add the expression of our own confidence that this "job" will be well done.

On to Cleveland!

THE PROGRAM on pp. 200-202 in addition to the intrinsic values the titles convey as to the problems with which the many papers deal—has another claim to distinction in that it indicates, as seldom occurs within the span of one convention, the breadth and scope of the great field of *industrial* medicine. From end to end it is a veritable panorama of medical, scientific, industrial, and *human* interest—wherein the experiences of the experts become available to the many who are, themselves, progressing toward their own respective expertnesses in their various industrial relations. Hence we repeat our own often-used expression of hope, and privilege: "See you at the Convention!"

INDUSTRIAL HEALTH AND DISEASE

Physician's Duties and Relationships in Industry

ARTHUR J. TRONSTEIN, AB., M.D.

MODERN industrial life involves almost every phase of society.* The physician is no exception, and his peculiar position is quite complicated. We shall attempt to discuss some of his more common problems, not so much from the medical aspect, as from the place the physician shall hold in the management of these.

The industrial doctor must attempt to serve all concerned with justice, art and science. His duties will force upon him many considerations aside from those of a definitely technical nature, but neither legal problems, social views, monetary awards, friendship, etc., must interfere with his first duty as a physician, to practice good medicine and thus help raise the standards of his profession. Often sufficient pressure will be placed upon him to make this a hard thing to do. Business firms are prone to look upon medical services in much the same light as they do other materials they purchase for the running of their business. However, most of the better firms have come to find that good medical service, properly paid for, unhampered within reason, and administered in good faith, is still a wise investment.

We shall attempt to discuss the physician's duties and relationships in industry as based upon our experience as Medical Director of the Pharis Rubber & Tire Co. of Newark, Ohio, (approximately 500 employees) and the Ohio Power Co. of Newark, Ohio, (approximately 400 employees) whose cooperation we have enjoyed for the past two years.

Pre-Employment Examination

MANY firms are finding it well worth while to examine all applicants for employment. This is done mainly to prevent the employment of persons likely to prove an economic problem to the firm for one or more reasons. This may be because some defect would prove later to be an Industrial Commission case (notably herniae), or because he may be subject to long lay offs from illness. While this is the primary reason for such an examination, certainly neither the physician nor the applicant has anything to lose by it.

Here let us point out certain non-technical aspects. One should have it clearly understood by all concerned that regardless of the fact that the company may be paying for the examination, the physician can not divulge any information obtained from it or its attending laboratory work, etc., unless the applicant is willing to allow this. This permission should be written, and properly witnessed before anything is done. It should be well understood that the physician is in no way responsible for the hiring or failure to hire of the applicant. The physician's only connection is to report such findings as he feels of note, possibly explain them briefly, and allow the firm to decide if the patient is fit for the job. The doctor will be wise to impress this upon the applicant before starting. In some cases the employer may delay employment until the defect is corrected, but the physician should guard that he doesn't create the impression that correction of a defect,

* From *Ohio State M. J.*, March, 1939.

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is a guarantee of employment. The job may be filled in the meantime. Remember also that a defect may be noteworthy for one type of job, but not for another. Allow the employer to decide if it is.

The degree of care and detail used in making the examination requires as much common sense as it does skill. The main purpose of the examination is to determine if there is any reason why the party may not be employed, not to seek for every petty pathological condition which might make the man anything short of 100% healthy. Petty defects, such as dirty teeth, skin blemishes, cerumen in the ears, etc., while of interest to the patient, mean very little to the employer. These defects may be pointed out to the patient, but need not be called to the attention of the firm. Where abnormalities of note do exist, report them promptly and in some detail to the employer. He may ask for a brief explanation of them, and also ask your opinion as to their future outlook.

The History

THE complete examination consists of history, physical examination, and laboratory work. The history of the applicant should only bear upon such points as shall have to do with his ability to work steadily. First determine if he is in good health at the present time as far as he knows. If he is not, notify the employer, and await his verdict as to whether you shall continue. Next consider his family and marital history.

Look for nervous diseases, mental cases, tuberculosis, syphilis, contagious diseases, family abnormalities, and similar details. In considering the past history, note all operations, severe injuries, war wounds, shell-shock, gas or vapor poisonings, infectious diseases, etc., which have possibly left some impairment of functions in their wake. Inquire concerning venereal diseases, but do not trust statements of a "pure past." Take good note of allergic conditions, vaccinations, serum therapy, inoculations, etc., related in this manner. Investigate thoroughly all symptoms relating to the cardiac-vascular-renal system. Considerable light along these lines may be found by inquiry as to whether the patient was ever refused insurance, kept out of school for long periods of time, dismissed from athletics, or refused employment at other concerns for medical reasons. Inquiry should also be made as to type of work the patient has previously done with special reference to the possibility of occupational diseases lying dormant (silicosis, lead poisoning, etc.) since these may become active later.

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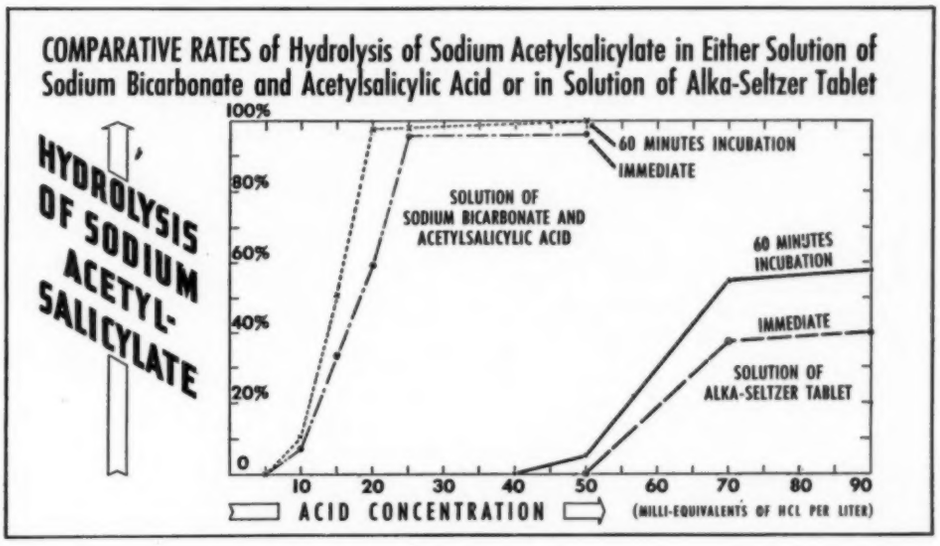

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CONCLUSIONS

1. The rate of hydrolysis of sodium acetylsalicylate in a solution of Alka-Seltzer to which hydrochloric acid had been added is at most not more than one-fifth of that found for this salt prepared from an excess of sodium bicarbonate added to acetylsalicylic acid;

2. Experimental results indicate that Alka-Seltzer in solution contains an efficient buffer mechanism capable of protecting the sodium acetylsalicylate against hydrolysis by hydrochloric acid within a wide range of concentration;

3. Experimental findings indicate that the end products resulting from dissolving an Alka-Seltzer tablet in water are sodium acetylsalicylate and sodium citrate and that the latter serves as an efficient buffer against hydrolysis.

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Physical Examination

BEFORE starting the actual physical examination, make note of the applicant's general appearance, his gait, his posture, his ability to respond to orders or questions, and his general ability to coordinate motions. Height, weight, age, sex, marital state, color, and temperature are then recorded. Next test his visual acuity, color blindness, reaction of pupils, and make note of any other pathology. Mild reduction of vision should be noted for the employer with your recommendation as to whether glasses would be of value. Allow the employer to determine if the eyesight is good enough for the particular job involved. The same may be said of reduced hearing as tested by any convenient means. Generally, reduced, but not greatly impaired hearing, is not a big point in these cases. Nasal obstructions, polyps, perforations of the septum, etc., are to be noted, and also any evidences of sinusitis, allergic rhinitis, etc. are noted. In inspecting the mouth record any evidences of lues, ulcerative conditions, and especially Vincent's infection. Poor hygiene, caries, etc., are not of great importance, but should be recorded, and the patient instructed to see his dentist at once. All glands and lymphatics (especially the inguinals) are next inspected closely. The neck is examined carefully for goiters, and also careful note is made of distended cervical vessels as pointing to cardiac damage.

The breasts are next inspected. This is especially important in the female. Transillumination and palpation are very valuable here. An ordinary flash light may be used if desired, but keep the focus as small as it can be made. Next the condition of the pulse, radial vessels, blood pressure, heart, lungs, and thoracic contour are most carefully examined. Even minor abnormalities in these should be noted in detail, and these points explained to the employer. One may add here that high blood pressure readings, rapid pulse rates, irregularities of the pulse, and certain similar conditions may be from psychic stimulation, and should be carefully investigated in all fairness to the applicant. If any doubt does exist, delay judgment until all investigation has been completed. The abdomen is inspected and examined as usual. Tenderness, masses and scars are noted and evaluated. With the patient standing, test for hernias or relaxed rings. Usually even a mild degree of relaxation (especially of the internal rings) will prevent employment as the firms are very strict in this respect. However, your opinion as to the use of a truss may be the determining factor, but usually the firm will not consider this unless it is a special case. Vaginal examinations are not generally done, but may be if any indication is present. This is very true if early pregnancy is supected or any pelvic condition is suspected. The genitals,

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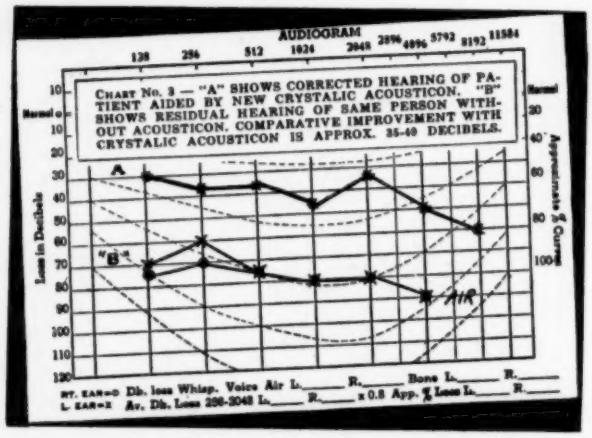
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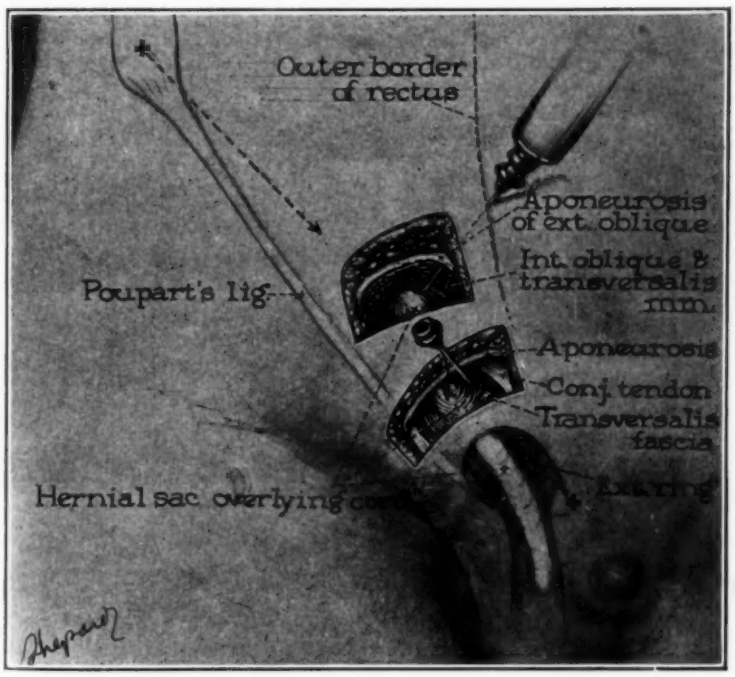

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Ambulatory Illness

IN MANY plants a full-time doctor is present to treat such ambulatory illness as arises. This policy has many advantages, but the bulk of the employers do not have such services available. It is very common for conditions to arise which require medical attention in order that the employee may go on well with his or her work. Such common ailments as headaches, painful menses, vertigo, and similar complaints are seen daily in plants. Too often these complaints are treated by a company nurse or some person less well trained than this, and are never seen by a physician. For example, the worker developes a headache. He goes to the first aid room, tells the attendant, and is given aspirin (or some other analgesic sold to a lay purchasing agent by a drug salesman at a bargain price). In other cases the employee merely looks over the shelves, and helps himself to whatever looks good to him. These methods are to be severely criticized. The employer will find them a poor investment from the economic view alone if he is shown that such methods will lead to longer periods of illness, malingering, and even more serious factors. No doubt that legally he may find himself in trouble if his lay attendant ruptures an appendix for an employee by giving him "a dose of salts" for his bellyache. The employer should also be shown that being quarantined either in part or as a whole may prove the costly sequence to allowing his attendant to guess if a condition is a contagious one. Many less severe diseases such as Vincent's, trichimoniasis, etc., have been spread through plants with resultant expense just this same way. Any employer will find these facts interesting from the economic viewpoint.

Where no full time physician is available in the plant, and this is the more common practice, several courses are open. In some factories the doctor visits the plant daily at regular times, and sees all the ambulatory illness at once. He may, if he feels it best, order such medicine, materials, manipulations, etc., as are provided by the company, and allow the attendant to carry out these orders. He should be certain that the attendant is capable of following

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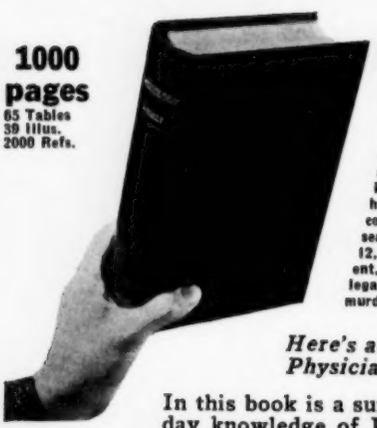

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orders accurately, and also that this attendant will not do anything unless ordered to do so. The physician should not forget that he is possibly legally responsible for the acts of this person. If the attendant is found taking such responsibility upon himself without orders, dismissal should follow. Let us add here that sometimes the industrial doctor finds some product peculiarly well suited for a condition common in the particular industry. Such preparations are often unknown to the average practitioner. Only too frequently these "stock" medicines are dispensed ad lib by the attendant to every patient that has any condition that even faintly looks like the one it was intended for. They should never be used unless ordered by the doctor, and there is no reason why the company doctor can not suggest these preparations to the private doctor, and then allow him to use his own judgment as to whether they are to be used or not.

If illness arises when the regular visiting time by the company doctor seems too long off, the worker should be allowed to leave his work long enough to see his own doctor. Usually if this is done on his own time, a goodly amount of the ailments will be found to be less severe, and the patient will not find it so necessary to have immediate medical care. He can go to the private doctor after working hours. These same remarks hold true where there is no regular visiting doctor. Let us also say that only those ailments arising as a result of occupation or which need attention at once should be treated by the company physician, and even then only if the employee spcifically agrees to being treated by him. The more the company doctor treats, the less the patient has to say about his choice of doctors. Also the more medicine practiced in the plant, the less there is left for private practice. Too often the employees use the company physician merely to avoid personal expense. Since this apparently is easy to do, the practice is spreading rapidly. Ultimately this will lead to poorer standards and economically poorer private doctors. A patient well enough to go to the first aid attendant or the factory doctor is also well enough to see his own doctor. If he is too sick for this, he should go home, and get private care there. The care of ambulatory illness in the factory by a company doctor should be limited as much as possible, not encouraged to grow.

Industrial Accidents

BEFORE going into this matter, let us say at once that we shall make no great attempt to discuss the technical details of caring for the lesions. This is too large a subject for this paper. Our purpose is to show what shall be expected of the company doctor as far as the handling of the accident goes.

Most accidents could be avoided, and it is a proper function of the industrial doctor to help in prevention. His cooperation with the safety engineer, employees' committee, etc., will always be welcome. Much of his help may be furnished without his actually being in the plant. His records and his observations from them are most useful. If the same individual seems to be having frequent accidents, he should be investigated for the reason for this. Sometimes a physical defect not noted heretofore is the reason. Other times it may be his specific job creating undue hazards. Where the same type of accident or occupational disease seems to appear in large numbers, the physician should call this to the attention of the proper authorities. The various functions of the body are often impaired by the foreign materials in the air, or from handling of chemicals, or from peculiar postures, undue heat or cold, exposure to radioactive substance, etc. The company physician may be of invaluable aid if he will study his records, his x-rays, laboratory reports, etc., to see the various changes in the skin, lungs, eyes, heart, and other organs as they are subjected to the factors noted. Often, too, the doctor may be able to prevent damage by noting these evils in the factory, and carefully studying various employees subjected to them to see if any ailment is lying dormant or is in an incipient stage. Much good legislation and safety regulation has found its champion in the industrial doctor.

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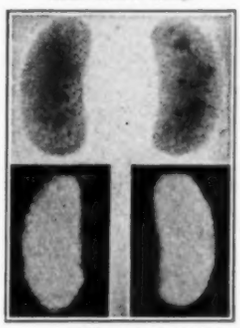

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Aside from the actual care for the patient, many aspects need consideration. In most states the rules of the Industrial Commission very definitely state that the employee is to have full freedom of choice of physicians. Never forget this. When an accident happens, it should be well established that the patient made no specific choice before the company doctor is called to attend him. If the patient has made a choice, then every effort to reach that private doctor should be made, and if this fails, allow him to decide if he wishes the industrial doctor or cares to name a second choice. If the company doctor renders immediate service, and later the patient wishes his family doctor, the company man should willingly step aside or be willing to cooperate with the family doctor. High handed methods forcing a company doctor upon an employee will in no way add to the prestige of the medical profession or the doctor himself. The law does not permit, nor does it require the employer to name the doctor for an injured employee. It merely requires him to provide some type of compensation for these accidents.

When an accident does happen, much will depend upon the facilities of the particular plant. In each major division of the plant there should be an adequate first aid box and somebody properly instructed to use it. These boxes are not expensive, and usually can be kept in some convenient place. Frequent inspection of these should be made to see that they are well-stocked. If there is a regular first aid room or dispensary, these boxes may not be needed. If a company doctor is present when the accident occurs, nobody should do anything for the patient until he is seen by the doctor. If the doctor is not present, first aid as instructed by the doctor beforehand should be rendered, and the proper doctor called at once. Nothing more must be allowed to be done by the attendant.

No accident, no matter how trivial, should be dismissed until seen by the doctor and dismissed by him. Good records of even the most minor accident are of much value, especially where later complications arise.

Much that was said about attendants and nurses in our discussion of ambulatory illness applies here. It has been our common experience to see ugly scars, lock-jaw, contractures, infections and the like following the "care" given them by unauthorized persons. Only a physician is capable of diagnosing and treating. If attendants can not or will not realize this, they should be dismissed. Very frequently compensation is denied the employee because he didn't have recognized care from the start. On the other hand, the industrial doctor should not seek to make big fees by over-treating cases. This will only lead to lowering of fee schedules by the Industrial Commission, and is certainly not fair to the employer.

Sanitation and Hygiene

THE problems of hygiene, sanitation, light, temperature, etc., are for the most part those needing the services of regularly trained men, but frequently the doctor's advice will be the basis upon which these men operate.

It should be the duty of the doctor to help see that washstands, toilets and drinking fountains are kept free from contamination by persons unfit to use them. This is often a hard problem. One can not inspect each individual using them, but he can help get the employees to cooperate, and to properly instruct them. Certainly he can help solve individual problems as they arise.

Contagions

PERSONS having venereal diseases, trichimoniasis, local abscesses, body lice, scabies, vaginal discharges, etc., should be furnished with a commode rather than to be allowed the use of toilets used by others. The care of such patients should be left to the private doctor, and the patient should be kept from using toilets until he has been completely cured or rendered non-contagious. It may seem advisable to dismiss the employee until he is able to safely use the facilities, but this should be left to the employer's discretion. As an added precaution, the company doctor may inspect the patient before allowing him to return even though he may claim his own doctor has discharged him as cured.

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Drinking fountains present much the same problems. Here the chief offenders are Vincent's, local lesions of poor hygiene, luetic lesions and tuberculosis. The management of these problems is much the same as above.

Washrooms, showers, and locker-rooms are common sources for the spread of "athlete's foot," parasites, scabies, etc. Frequent cleansing and disinfection are needed to keep these conditions to their minimum. Those who know they carry such conditions should be excluded from the use of the fixtures. If no other facilities are available, these persons should be given their own basin (an enameled dishpan will serve well) and be requested to use this only.

Where contamination has taken place or is suspected of having occurred, thorough disinfection under direction of the doctor should be done before continuing use of these facilities. The local health officers will be able to give good cooperation along these lines. Sometimes the help of these authorities will make it possible to enforce rules where orders from one with less standing may be ignored or resented. At this time let us point out that segregating suspected carriers or insisting upon examination of particular groups may lead to complications with certain recent labor legislation which forbids discriminatory action. Just whether this particular problem is involved is difficult to say at present, but it has been encountered already, and has made things rather complicated. It will be wise to seek advice on the matter before doing anything drastic.

Working Conditions

THE details of discussion concerning temperature, illumination, humidity, etc., have been well attended to by other writers. These problems for the most part are usually solved by proper engineers. In passing one might remark that with the increased use of "air-conditioning" there has been an increased abuse of these devices. Usually they are not adjusted properly so that the rooms are kept too cold in proportion to outdoor temperature. A difference of 10°F. is the maximum suggested. Further study of the effects of this abuse will be made later.

Group Insurance, etc.

IN THE past few years there has been a great increase in the adoption of various forms of collective service plans whereby employees as such are supposed to derive better medical care in case of illness, disability or death. Much of this growth may be explained by saying that the private insurance firms have found this a rich field to work. A goodly part of this is due to promotion of less ethical schemes. Political activities, publicity promoters for clubs, lodges and fraternal organizations and similar groups are acting as sponsors for all sorts of these schemes. We do not feel that all of these plans are detrimental to our profession, but most certainly a large number of them are. Since the background of these plans lies in the field of medicine, it becomes a logical place for the investigation of the industrial doctor. If he honestly feels the plan under consideration is sound and will help solve some problem in this professional life, he may honestly recommend it. If he feels that it is not best for the practice of good medicine, he should feel dutybound to oppose it to the end. One can at least say he should investigate any proposed plan carefully before expressing an opinion on the subject.

We suggest the following points as a background for the formation of this opinion. First, is there a need for collective action or could the individual obtain this protection for himself if he so chose? Usually he could. Second, if there is a need for collective action, will the plan proposed prove adequate? The idea of adequacy should be based upon consideration of many aspects. Adequacy assures that the plan will meet most of the peculiar disabilities found in the particular industry involved, and will not make these exceptions exempt from payment of benefits. It also implies that all age groups used in the industry will receive benefits since age is often a determining factor in a man's ability to hold a certain job. If his youth or age are to be made points of exemption, such

a plan should be opposed since he will be paying for something he may never be able to benefit by. Benefits should be paid long enough to cover the longer types of disability common in the industry, and should not be limited to only those of short duration. Finally, adequacy means that the benefits derived are to be in decent proportion to the risks involved by the occupation of the member.

Third consideration is the financial end of the deal. Here the help of a good attorney is very valuable. Often the firm has its own who will be glad to help. Most certainly he should make sure the sponsor or promulgator of the plan has a legal right to do so, and is legally able to contract for such a plan. Insurance laws of the various states differ, but basically they state that insurance or corporation activities are limited to such firms or groups as are legally recognized by state law. Many such plans have been formulated by persons not entitled to do so, and bring trouble for those subscribing to them.

Next determine if the premium to be paid is in good proportion to the benefits derived. Many times a better bargain can be made with some other firm or by the employee purchasing his protection as an individual. Another point to consider is if the amount of benefit is large enough to allow the individual to maintain something like his former standing of living. A very small benefit will not allow him to meet payments on goods bought on installments, or to continue the education of his children, etc. If the benefit is very small, he may be better off using the amount paid for premiums to pay off these debts in order not to lose them in case he is disabled. If he is going to go $20 a week in debt at a time of disability, he may as well go $25, and still not lose his equity in things he has purchased. Finally what becomes of money paid for protection in times which make it impossible to keep the plan paid for? For example, a man may have kept up his end for several years, and then because the plant is closed, or because of floods or other catastrophe, or because the firm moves the plant away, or because he is discharged or laid off, or because of war he can not pay any more. Does he lose all his money? Does he have a grace period? All these financial points should be considered well.

The fourth, and most important feature to consider is what results will such a plan have upon the practice of medicine? Sternly oppose any plan which:

(a) In any manner fails to allow full freedom of choice of physicians.

(b) To even a slight degree prevents the attending doctor from using his best judgment.

(c) Forces the doctor to disclose information obtained in the confidence of his official position.

(d) Requires membership by either patient or doctor in clubs, religious organizations, fraternities, etc.

(e) Limits the doctor in his selection of consultants either as to number or type.

Where such plans are already in force at the time the company doctor makes his affiliation, he should promptly investigate the plan, and do all he can to better it or to discourage it if he feels it is not good for the medical world. Whatsoever is ill for the practice of medicine is eventually a poor investment for the employer in spite of all the pressure the sponsors may bring to show this isn't true.

Private and Industrial Practice

NOT rarely a patient seeks the company doctor as a private physician. This is certainly a logical step, and most company doctors feel this is a part of their compensation for the time they give to industrial life. However, this condition raises many perplexing problems. In some cases the patient has a disease which if made known to the employer would lead to dismissal of the employee. This would work an economic hardship upon him, yet his presence may be a danger to his fellow workers. At the same time, had he sought another doctor, he may have been free from the risk of dismissal. The physician must remember he has no ethical or legal right to disclose this information without the specific permission of the sufferer. Often this picture is complicated by the fact that some fellow worker may have exposed the thing to the employer, and the dismissal is laid to the doctor's breach of confidence. How to meet this problem is a difficult thing to say. Each case is an individual problem. In some cases where this condition is likely to arise, the company doctor may be wise to tell the patient the facts, and refer him to some outside physician. In other cases the patient may be induced to take a sick leave till he is cured. At other times he may be induced to do so through cooperation with the health department. Other times he may have to be convinced it would be very injurious to work while ailing with this disease. Many times no good solution seems to present itself.

The industrial doctor is in a good position to influence employees to seek him for private care. This seems easy to do, and could be very lucrative. However, in the long run such tactics will breed discontent from his patients, ill will amongst his colleagues, and disfavor from fair-minded employers. If patients seek him freely, they will establish most welcome contacts with the industrial doctor as a private physician, but if they are coerced even slightly, much that would be an asset to a practice proves to be a liability, and eventually the good reputation of the physician suffers.

It will prove well worth the trouble to crosscheck records from private practice against those of the company files. This is especially true in Industrial Commission and insurance company cases. Such cross-checking will also help forestall malpractice suits. Often information so derived aids in making a better diagnosis, or instituting therapy, or avoiding duplication of work.

Not rarely is it found advisable for the company doctor to work with the family physician. In such cases as are referred to the latter by him, the company doctor should be paid by the patient since he is actually acting as a private consultant. The reverse is true when the company doctor seeks outside aid in his practice as company doctor. Here the company should pay the consultant since he is acting on company business.

Preventive Medicine,

EMPLOYERS today are taking a decided interest in the outside lives of their employees. This is true as related to health and social problems to a large extent, and while we will not go deeply into the subject, we feel certain points are worth making. The industrial plant is a fine place to do preventive and socio-medical work. It offers convenience of assembly, certain helps along the organization lines, and frequently financial backing. The returns in good health and freedom from loss of working time certainly repay the efforts put into such projects. Here again let us point out that it should not be the function of the industrial doctor to see how much of this he can do himself, so much as it should be his aim to create interest in these questions so the employee will seek private care. He may also help in organizing groups, suggesting projects and leading discussion about them.

Certain fields of preventive medicine have been invaded by all sorts of persons not qualified to render this service. It is too easy today for persons to obtain vaccinations, Schick tests, Wassermann tests, typhoid inoculations and similar services either free of charge or for a trifling sum, from city nurses, insurance company nurses, health depots, school nurses, social-service agencies, etc. In many instances these services are rendered by laymen. Frequently there is no investigation to see if the patient is allergic, to see if this work is needed, to tell if results are good (leaving behind a false sense of security), and also to see if the patient could have paid some private doctor for this service. It would be well for organized dental and medical societies to actively oppose these non-medical groups rendering medical service. The industrial doctor should not attempt to increase such practices by allowing his factory attendant to do this, nor should he himself foster this unless it is to be done by private physicians or the employees

are to pay for his services themselves.

Sex hygiene, adolescent hygiene, and similar subjects may be taught to properly selected groups. The company organizations may be used as a nucleus. This is a field which holds rich promise, and is worthy of all the efforts it may require.

Injuries occurring in athletics, recreational activities, etc., should be handled like industrial accidents, but some provision should be arranged for beforehand to pay expenses involved since these are not usually provided for by public funds.

Most company health camps seem to be well manned, to have good first-aid stations. They will seem to have met satisfactory facilities for sanitation, etc. Regular inspections should be made to see that all is well. When injuries do occur here or illness befall any employee, first-aid should be given, and the patient sent to his family doctor. If this is not practical, obtain the patient's permission to treat him before doing so, and be especially careful when dealing with minors.

Summary

THE physician's duties and relationships in industry were discussed under the following headings:

1. Pre-employment examinations.
2. Ambulatory illness.
3. Industrial accidents.
4. Sanitation hygiene, etc.
5. Group insurance, hospital service plans, and other benefit services.
6. Patients common to private and industrial practice.
7. Preventive medicine, health camps, medical social-service, etc.

No great attempt was made to discuss the technical details of diagnosis or therapy since this was not our purpose. We wished to point out the major problems of the industrial doctor, and to show what we consider the best methods of disposing of the problems. The basic principle involved was to urge these doctors not to allow their good medical judgment to be subjugated by economic, political, social, or legal pressure. We also urged the industrial physician not to attempt to extend his fields of activity to such a point that they hamper or compete with private practice since such extension will only lead to lower standards of medicine and economically poorer private practice.

Modern Concepts in Industrial Medicine

THERE is interwoven in the activities of an individual, whether working alone or as the member of a group, the ever present chance that harmful as well as helpful influences may be created.* Thus emerges the concept of even-handed justice which enjoins upon us the necessity of taking stock of one's work in terms of its net effect upon society as a whole. Changing conditions with sequential bearings upon the interests of all groups and levels of society have forced a recognition of the fact that wide application of the principle of common equity must prevail if we are to avoid threatening failure of the so-called American way of life. Revealed, too, is the necessity of mutually cooperative effort in contrast to individual action in the attempted solution of our diverse community problems.

Among the many that challenge us as physicians is that found in the newer field of medicine designated under the general head of Industrial Health as opposed to the older and less inclusive terms of Traumatic or Industrial Surgery. The title Industrial Medicine seems preferable when it is remembered that this rapidly expanding service is charged with the development and preservation of the total health of workers—an activity requiring the talents of physicians in the broad field of everyday practice if the full implications of the task are to be met.

Sound business practice seeks to avoid, in so far as is possible through wise management, the imposition of preventable burdens upon its employees. But all business is not sound nor is all management wise. Even so implemented the problem of health hazards inherent in the broad field of manufacturing is of such nature as to require approach through a well coordinated program in which sanitary and technical engineers together with physicians skilled in preventive and curative medicine must take their places along with alert business management if future activity in this important medical field is to have the attention which its importance makes mandatory.

Beginning with the passage of American compensation laws in the early part of this century, and to the extent prescribed by the medical provisions of these acts, employees and indemnity insurance companies assumed responsibility for restricted medical care of workers covered by such legislation. The earlier acts limited indemnity to medical care and wage loss resulting from accidental injury. There has been added, however, in many states, coverage for occupational diseases and it seems consistent with trends to predict that in the near future a similar provision will be found in compensation laws throughout the country. To these mandatory medical services provided for such a large group of our population—services which by their legal nature subject them to all the dangers inherent in other forms of socialized medicine—are to be added voluntary plans of medical care through which more or less complete service for all forms of illness arising in connection with work is furnished. Some of these plans extend beyond the plant to include the workers' dependents. It should be made clear that the origin and expansion of these forms of medical care, while welcomed by employers because of the contribution they make to a sense of protection from all advised presecution for personal injury but more particularly because a good plant medical service reduces the number of injuries and absenteeism because of sickness, thus favorably influencing the production schedule, are yet not to be interpreted as designed attempts upon the part of industrial management to usurp the prerogatives of the medical profession. On the contrary these service plans in industry must be accepted as a logical and necessary evolution arising from necessity and justifying the approval and support of good business and the medical profession alike. When the potential population eventually to be served by these expanded plans is considered, estimated to be not less than one-third of the nation's workers, it becomes apparent that medical leadership must be supplied to guide those who are now operating such plans but particularly to give assistance in setting up new programs in this field if the traditional patient-physician relationship is to be preserved. It was with these considerations in mind that the House of Delegates, meeting last year in Augusta, and in response to a recommendation of the Subcommittee on Fee Schedules, of which Dr. C. F. Holton was chairman, approved the appointment of a Committee on Industrial Relations and authorized the formation of the Georgia Association of Industrial Surgeons. Likewise in acknowledgment of the great assistance which such state committees and organizations could render in reciprocal activities such as the elaboration of standards of industrial medical practice, the guiding of interrelationships in the profession and outside and in matters of detail in which it is desirable that the profession speak with uniformity and consistency, that the Council on Industrial Health of the American Medical Association, early after its organization, requested constituent associations to appoint committees under whose direction local problems, concerned with the welfare of employees in industry might be equitably resolved.

Along with other interested agencies in the State — employers, labor leaders, insurance companies, administrators of compensation law — the Georgia Committee on Industrial Relations which—in the interest of uniformity and in keeping with the suggestion of the Council might henceforth be spoken of as the Committee on Industrial Health—has an enormous amount of work to do in order that this growing medical service, falling under the general head of Industrial Medicine, may be guided into and protected by the same ethical principles as characterize the

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* C. W. ROBERTS, M.D., Atlanta, in *Journal of the Georgia Medical Association*, April, 1936.

older branches of medicine. This newest specialty desires and deserves to be protected by the same high standards as are accorded to its sister departments. Good medical care rendered by physicians of high professional and ethical standing is the end devoutly to be sought. Anything less will not only dishonor our profession but impose upon a growing group of our population a counterfeit system of practice, inspired by commercial motives and subject to the importunities of lay directorship. It may be said, however, to the credit of interested groups, both lay and professional, that the period which tolerated in the industrial physician a lesser measure of integrity or excused in him derelictions in either educational or physical appointments for his task, has happily passed into the limbo of an unsung era. We have already arrived at a point in the evolution of industrial medicine where the poorly prepared physician, either from the standpoint of professional fitness in this new field or because of ethical casualness is no longer equal to the tasks which are devolving upon him or able to command the respect of enlightened industrial employers.

Through the solution of the pressing problems of medicine in industry where we find one-third of our population too proud to accept charity, too poor to meet unaided the modern cost of efficient medical care, we may yet find for the perplexities of all medicine a muchly needed breathing spell and perhaps even more, that through a strange paradox, the profession's erstwhile contrary stepchild may yet prove to be the modern Moses to lead us out of encircling gloom into the cheering light of a new medical day.

— *Continued from page 1.*

SOUTHERN RAILWAY at Washington, D. C., June 13, 14, and 15 (see page 199); and the Twenty-Fourth Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS with the AMERICAN CONFERENCE ON OCCUPATIONAL DISEASES AND INDUSTRIAL HYGIENE at Cleveland, Ohio, June 5, 6, 7, and 8. The *Tentative Program* of the latter appears on pp. 200 and 201 herein; and following are the Constitution and By-Laws of the A. A. I. P. & S. with certain proposed amendments, published herewith in compliance with the Sections requiring such publication in advance of consideration by the Board of Directors and the Members. The Program is comprehensive and inspiring—it well sustains the conclusion frequently stated in the pages of this Journal, that "in convention circles this year, all roads lead to Cleveland" . . . . WE heartily commend to wide and careful reading the article by DR. ARTHUR J. TRONSTEIN, on "Physician's Duties and Relationships in Industry," first published in *Ohio State M. J.*, and republished here, for our wider circulation among *industrial* medical men. It will evoke numerous reactions, all helpful . . . . THE NEW JERSEY ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, and the ASSOCIATION OF RAILWAY AND INDUSTRIAL PHYSICIANS AND SURGEONS OF KANSAS CITY are now Component Societies of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS . . . . Two states, Arkansas and Idaho, have recently enacted laws providing for the compensation of certain scheduled occupational diseases, in case of disability or death. The Arkansas law was approved as a part of the Workmen's Compensation Law on March 14, 1939, and becomes effective on June 7, 1939. The law includes a list of specified occupational diseases. The Idaho law, which is an occupational disease compensation law, covers certain designated diseases and was approved on March 7, 1939, becoming effective May 1, 1939 . . . . IN OHIO, a four to three majority decision of the Supreme Court of Ohio, rendered March 29, 1939, gives workers or their estates the right to sue an employer for damages in occupational disease cases not covered by the Workmen's Compensation Law. The Ohio Supreme Court denied the right to sue an employer under those conditions two years ago. An appeal of that decision was refused consideration by the United States Supreme Court . . . . DR. M. N. NEWQUIST, Assistant Director of the American College of Surgeons, in charge of the field work of the College in matters concerned with the acceptance of the A.C.S. Minimum Standards for industrial medical services by medical departments throughout the United States, and for some time one of our Editors, has been appointed Medical Director for the Texas Company, with headquarters in New York City. DR. NEWQUIST will continue his association with the American College of Surgeons .

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